AIR TRAFFIC
BY THE NUMBERS

June 2019

Federal Aviation Administration

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    - **ABP-230 – Data Analysis and Reporting Services Branch**
    - **APO – Aviation Policy & Plans**
    - **AST – Office of Commercial Space Transportation**
    - **AVS – Aviation Safety**

Data Sources

Database Name	Owned/Managed by
Aviation System Performance Metrics (ASPM)	AJR-G
Operations Systems Network (OPSNET)	AJR-G and AJW
National Traffic Management Log (NTML)	AJR-G and AJW
Traffic Flight Management System (TFMS)	AJR-G (archives) and AJW
National Offload Program (NOP)	AJR-G (archives) and AIT
U.S. Civil Airmen Statistics	APO
Runway Incursion Data	AVS
BTS T-100 Market and Segment Data	Bureau of Transportation Statistics

Table of Contents

Introduction

Air Traffic By the Numbers, or the *ATO Fact Book*, is a source book that contains U.S. airport and air traffic control operations and performance annual data from the Federal Aviation Administration (FAA). It also includes information on passengers, runway incursions, commercial space launch activity, the economic impact of aviation, and the like.

The *Fact Book*, produced by the Office of Performance Analysis, Air Traffic Organization (ATO) of the FAA, is updated annually, with data now current to FY2018. This particular document represents the third edition of *Air Traffic By the Numbers*; two previous editions appeared in August 2017 and November 2018.

Organization of the *Fact Book* is unchanged from last year. Section 1 includes some overall Air Traffic Management statistics. NAS Demand and Efficiency measures appear in Section 2. New Delay, Diversion, Go-Around, and Cancellation information follow in Section 3. In Section 4 are the latest data on the impact of various Traffic Management Initiatives (TMI). Updated FY2018 Safety Metric results are reported in Section 5. Other ATO Topics of interest are available in Section 6.

Some air traffic-related results for FY2018 show:

- The number of air traffic controllers rose by 1.5 percent, to 14,695 (in Section 1).
- The number of pilot certificates increased by 3.9 percent, to 633,316 (Section 1).
- The number of passengers flown by air carriers increased by 4.8 percent, to 1 billion (Section 1).
- IFR flights in the U.S. rose by 2 percent, to 16.1 million (Section 1).
- At any giving minute during peak operational times, almost 5,400 flights were en route in U.S. airspace (Section 2).
- Core 30 airport operations rose by 1.8 percent, to 13 million; operations handled by stand-alone TRACONS and Centers rose by 3.2 and 2.3 percent, respectively (Section 2).

Further, at Core 30 airports, we find:

- Flight delays fell by 9 percent, to 260,325 (Section 3).
- Flight diversions rose by 12.1 percent, to 18,010 (Section 3).
- Cancellations declined by 3.4 percent to 101,303 (Section 3).
- Runway incursions and airport surface incidents fell by 22.7 percent, to 395 (Section 5).

Some new items are included. First, we now show the number of pilot certificates by year. According to this data, the number of pilot certificates increased by 3.9 percent and the number of remote (or drone) pilot certificates rose by 53.7 percent in 2018 (Section 1). Second, additional years of total IFR flight data are now available. This series now begins in FY2005, instead of FY2009 (Section 1).

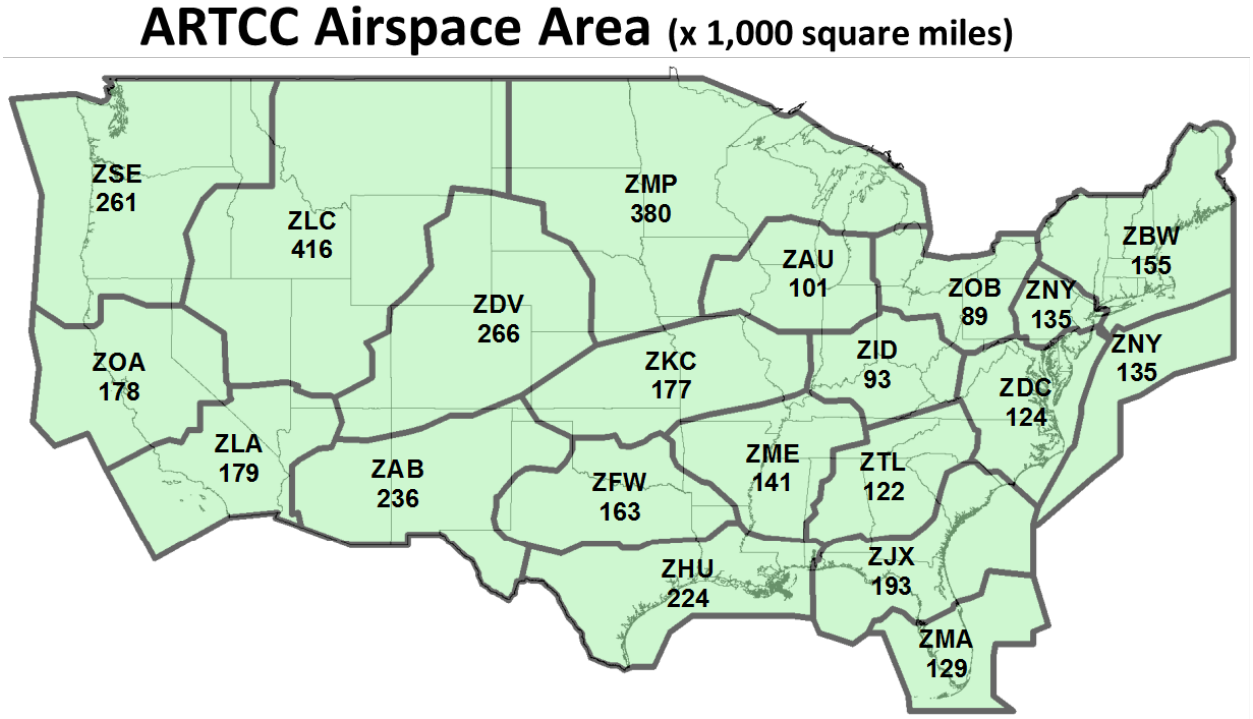
Our work on this publication benefited from the contributions from many offices and individuals throughout the Air Traffic Organization and the Federal Aviation Administration. We thank everyone who participated in this effort.

System Events and Analysis Group (AJR-G3)
Office of Performance Analysis
System Operations Services
Air Traffic Organization
Federal Aviation Administration
U.S. Department of Transportation

June 2019

Air Traffic Organization Leadership

www.faa.gov/about/office_org/headquarters_offices/ato/leadership



Section 1. Air Traffic Management System Overview for FY2018

ATO Program and Financing Operations Budget Estimate (in $billions) (FY2019)	**$7.5**
Flights Handled	
Scheduled	10,170,000
Unscheduled	5,952,000
Total	**16,122,000**
Airspace (in millions of sq mi)	
Oceanic	24.1
Domestic	5.3
Total	**29.4**
Airports	
Public Airports	5,092
Private Airports	14,530
Total	**19,622**
ATC Towers	
Federal	264
Contract	254
Total	**518**
TRACONs	
Stand-Alone	25
Combined ATC Towers	129
Total	**154**
En Route Centers & CCFs	
ARTCC	21
CCF	4
Total	**25**
NAVAIDS	**13,157**
Alaska Weather Cameras	**233**
Controllers	**14,695**
GA Aircraft (CY2017)	
Fixed Wing	167,100
Rotorcraft	10,500
Experimental/Lightcraft/Other	34,200
Total	**211,800**
GA Flight Hours (CY2017)	**25,212,000**

Sources:

ATO Program and Financing: U.S. Dept. of Transportation, Budget Estimates: FY219, Federal Aviation Administration, p. 2.

Flights Handled: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), March 7, 2018; Innovata, Flight Schedule Database, accessed March 7, 2019.

Airspace: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G).

Airports and **NAVAIDS**: Federal Aviation Administration, Office of Communications (AOC), Administrator's Fact Book, December 2018. https://www.faa.gov/news/media/2018_Administrators_Fact_Book.pdf

ATC Towers and **En Route Centers & CCFs**: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), Facility Information, accessed March 8, 2019; Federal Aviation Administration, Office of Communications (AOC), Administrator's Fact Book, December 2018.

TRACONs: Federal Aviation Administration, Air Traffic Organization, Air Traffic Services (AJT), Terminal Radar Approach Control Facilities (TRACON), March 30, 2016. https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/air_traffic_services/tracon/; Air Traffic Services (AJT), Federal Aviation Administration, Email communication, April 17, 2018 and December 14, 2018.

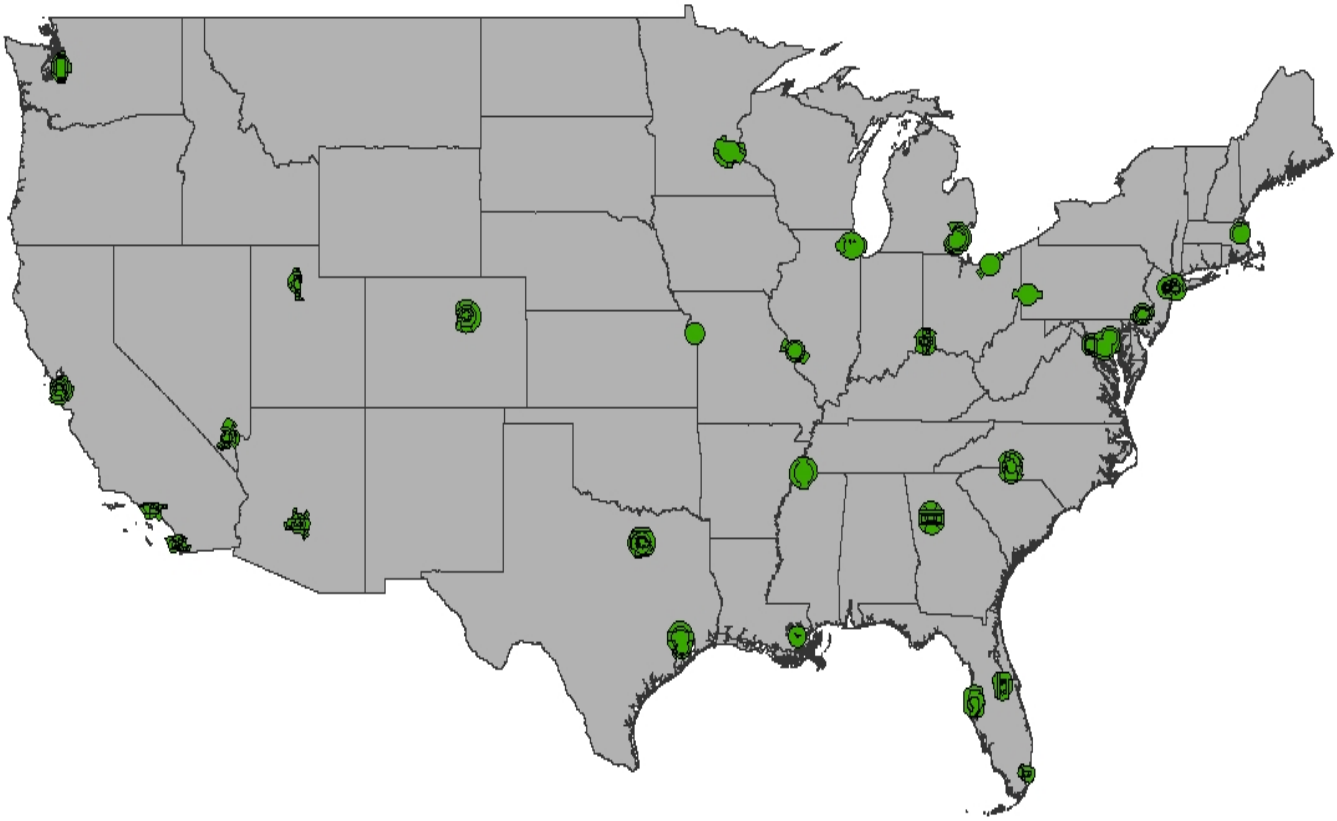
Alaska Weather Cameras: Federal Aviation Administration, Air Traffic Organization, Aviation Weather & Aeronautical Services (AJM-33), FAA Aviation Weather Cameras, accessed March 7, 2019. https://avcams.faa.gov/sitelist.php

Controllers: Federal Aviation Administration, Office of Finance and Management, Data Analysis and Reporting Services Branch (ABP-230), Air Traffic Controller and Academy Movement Report - September FY2018, October 17, 2018.

GA Aircraft and **GA Flight Hours**: Federal Aviation Administration, Aviation Safety (AVS), General Aviation and Part 135 Activity Surveys – CY2017, Tables 1.1 and 1.3, March 21, 2019. https://www.faa.gov/data_research/aviation_data_statistics/general_aviation/

Class B Airspaces (Airspace around Busiest US Airports)

Note: Airspaces accurately represented for coverage area

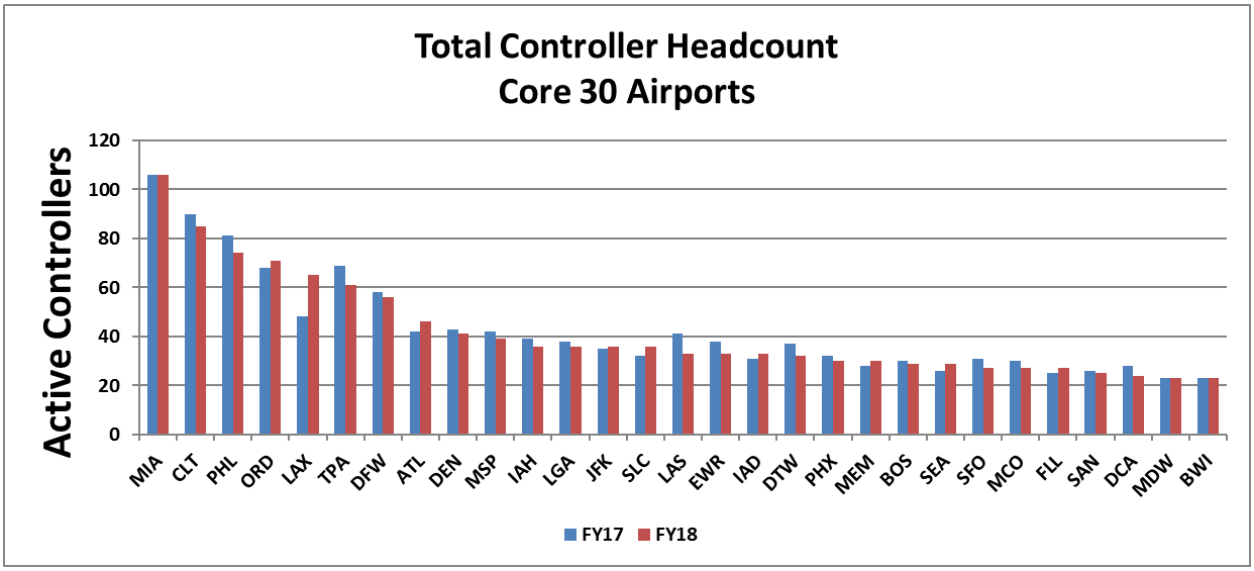


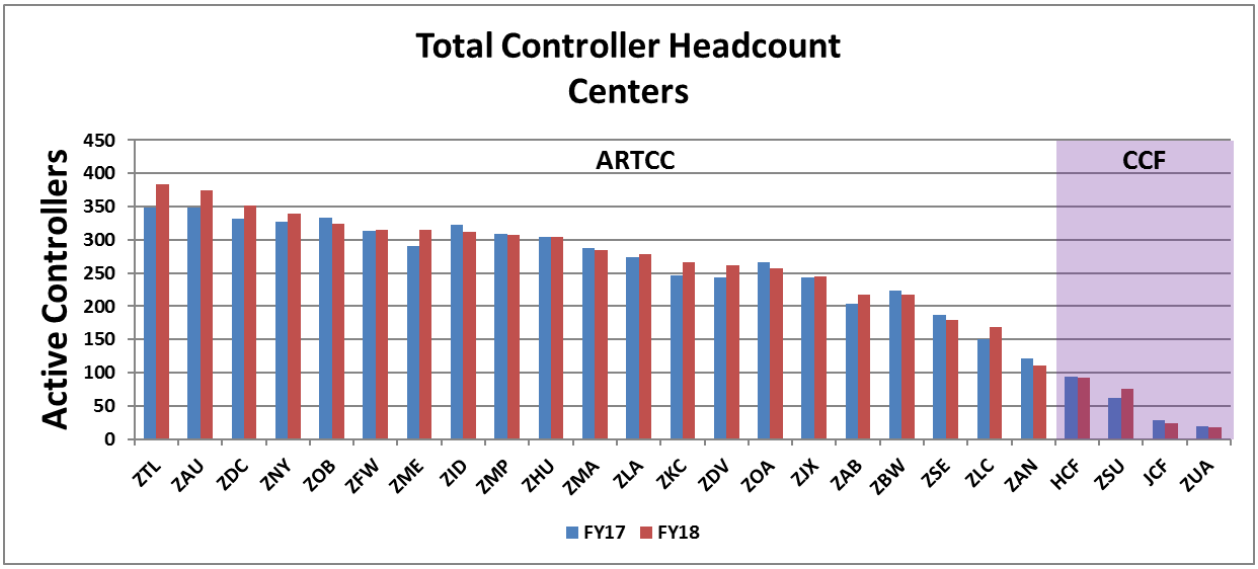
Air Traffic Controllers

As of the end of FY2018, the FAA air traffic controller total was 14,695, an increase from 14,481 at the end of FY2017.

	FY2017	FY2018
Academy Graduate (AG)	883	980
Developmental (D1)	204	220
Developmental (D2)	640	700
Developmental (D3)	533	582
Certified Professional (CPC)	10,544	10,483
Certified Professional in training (CPCIT)	1,205	1,320
Controllers	**14,009**	**14,285**
Academy	**472**	**410**
Total Headcount	**14,481**	**14,695**

At Core 30 airports, Miami (MIA), Charlotte (CLT), and Philadelphia (PHL) report large headcounts because these are combined ATCT TRACONs. LAX had the highest net gain of controllers at seventeen, while LAS had the highest net loss at eight. (*See*, the Appendix for explanations of the Core 30 airport codes.)





Source: Federal Aviation Administration, Office of Finance and Management, Data Analysis and Reporting Services Branch (ABP-230), Air Traffic Controller and Academy Movement Report - September FY2018, October 17, 2018.

Pilot Certificates

The table below shows the number of pilot certificates held by age group (upper panel below) and by year (lower panel). The upper panel illustrates that student, commercial, and remote pilots tend to be younger, while airline transport pilots tend to be older. The lower panel informs us that the number of total active pilot certificates held in the U.S. increased by 3.9 percent, from 609,306 in 2017 to 633,316 in 2018, mainly due to an increase in student pilot certificates from 149,121 to 167,804. Further, the number of remote (or drone) pilot certifications (which began in August 2016) increased by 53.7 percent, from 69,166 in 2017 to 106,321 in 2018. (Note, the pilot total does not include flight instructors and remote pilots.)

Estimated Active Pilot Certificates Held by Category and Age Group of Holder, as of December 31, 2018

By Age Group	Type of Pilot Certificates							Certified Flight Instructor 2/	Remote Pilot 2/
	Total	Student	Sport	Recre-ational	Private 1/	Commercial 1/	Airline Transport 1/		
Total	**633,316**	**167,804**	**6,246**	**147**	**175,771**	**115,776**	**167,572**	**108,564**	**106,321**
14-15	294	294	0	0	0	0	0	0	0
16-19	16,932	13,150	10	0	3,570	202	0	47	1,348
20-24	63,652	35,695	103	11	15,849	11,047	947	4,365	7,383
25-29	72,472	35,699	175	17	13,517	17,738	5,326	8,092	12,982
30-34	61,369	24,487	249	13	13,047	12,362	11,211	11,488	15,044
35-39	57,068	17,231	276	8	12,643	9,828	17,082	13,090	14,287
40-44	48,850	10,930	298	10	12,059	7,523	18,030	11,070	11,978
45-49	49,234	7,857	383	7	12,189	7,347	21,451	11,557	11,349
50-54	55,024	6,944	643	8	14,761	7,756	24,912	10,899	9,648
55-59	60,437	6,127	844	13	19,092	8,760	25,601	10,047	8,598
60-64	55,947	4,266	1,053	16	20,898	9,127	20,587	8,986	6,744
65-69	39,805	2,668	929	25	17,184	8,304	10,695	7,462	4,050
70-74	28,083	1,536	684	10	11,572	7,740	6,541	6,197	2,089
75-79	14,961	648	393	7	6,023	4,671	3,219	3,260	616
80 & over	9,188	272	206	2	3,367	3,371	1,970	2,004	205

By Year									
2015	**590,038**	122,729	5,482	191	186,786	116,291	158,559	102,628	N/Ap
2016	**584,361**	128,501	5,889	178	174,517	112,056	163,220	104,382	20,362
2017	**609,306**	149,121	6,097	157	174,516	114,186	165,228	106,692	69,166
2018	**633,316**	167,804	6,246	147	175,771	115,776	167,572	108,564	106,321

1/ Includes pilots with an airplane and/or a helicopter and/or a glider and/or a gyroplane certificate. Pilots with multiple ratings are reported under highest rating. For example a pilot with a private helicopter and commercial airplane certificates are reported in the commercial category.

2/ Not included in total active pilots.

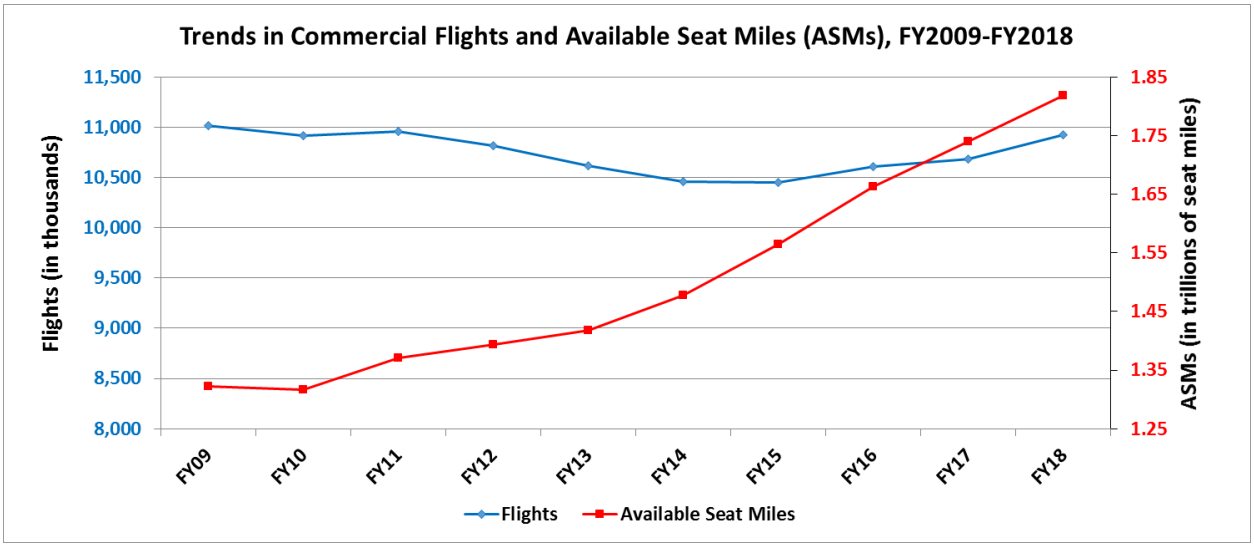
N/Ap Not applicable.

Source: Federal Aviation Administration, Office of Aviation Policy and Plans (APO), U.S. Civil Airmen Statistics, 2018, Table 12. https://www.faa.gov/data_research/aviation_data_statistics/civil_airmen_statistics/

Commercial Flight and Available Seat Mile (ASM) Trends

Since FY2009, there has been a reduction in scheduled commercial flights but an increase in available seat miles (ASMs). Note that the number of commercial flights are recovering in more recent years. ASMs are a measure of passenger capacity by air carriers. It is computed by multiplying the number of seats on an aircraft by the stage length of the flight.

In recent years, airlines have reduced the number of smaller aircraft and increased operations of larger aircraft. Also, the average stage length has increased. Both these factors increase total passenger capacity. Over FY2009-FY2018, data from the Bureau of Transportation Statistics show the number of commercial flights fell by 0.9 percent to 10.9 million in FY2018, but is recovering in more recent years. The number of passengers rose by 28.3 percent to 1,018.3 million, reflecting impacts of rising load factors and aircraft size. During the same period, RPMs and ASMs rose by 44.7 and 37.6 percent, respectively, indicating rising stage lengths and load factors. The table below shows passenger statistics for the two most recent fiscal years.



Source: U.S. Dept. of Transportation, Bureau of Transportation Statistics, T100 Segment Data, March 4, 2019.

Passenger Statistics		
	FY2017	**FY2018**
Yearly Passengers	971,794,148	1,018,339,442
Average Daily Passengers	2,662,450	2,789,971
Revenue Passenger Miles (trillions)	1.43	1.50
Available Seat Miles (trillions)	1.74	1.82
Passenger Load Factor (%)	82.14%	82.70%

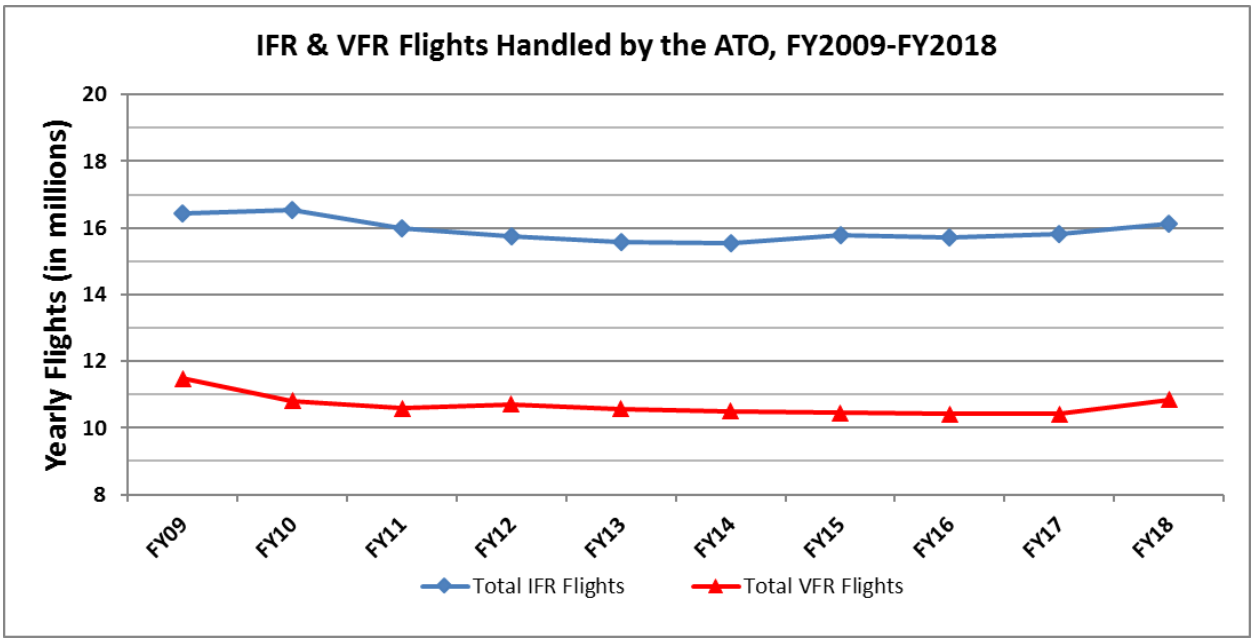
Economic Impact of Civil Aviation		
	CY2013	**CY2014***
Aviation in US generates # jobs	10,139,000	10,589,000
Earnings of (billions)	$427.00	$446.80
Aviation contributes annually (trillions)	$1.55	$1.62
Constitutes % of GDP	5.1%	5.1%

*Estimates for more recent years are not yet available.

Sources: U.S. Dept. of Transportation, Bureau of Transportation Statistics, T100 Segment Data, March 4, 2019; Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Economic Impact of Civil Aviation on the U.S. Economy, November 2016. https://www.faa.gov/air_traffic/publications/media/2016-economic-impact-report_FINAL.pdf

Instrument Flight Rule (IFR) and Visual Flight Rule (VFR) Flights across the NAS*

Office of Performance Analysis (AJR-G) data show the number of IFR flights rose by 2 percent to 16.1 million, and the number of VFR flights rose by 4.1 percent in FY2018. As the accompanying graph attests, the numbers of IFR and VFR flights fell following the end of the recession and have since been recovering.



*Note: OPSNET reports VFR activity as total operations (arrivals + departures). Total VFR flights are approximated by dividing total operations by 2.

Annual total numbers of IFR and VFR flights also appear in the table below.

Year	IFR Flights	VFR Flights
FY05	18,645,898	13,795,861
FY06	18,066,360	13,378,426
FY07	17,970,314	13,448,515
FY08	17,908,487	12,812,585 **
FY09	16,428,893	11,480,136
FY10	16,522,406	10,815,975
FY11	15,992,536	10,581,301
FY12	15,760,241	10,714,777
FY13	15,576,396	10,574,201
FY14	15,546,452	10,506,576
FY15	15,782,675	10,455,324 **
FY16	15,724,478	10,416,280 **
FY17	15,800,679	10,415,828 **
FY18	16,122,488	10,843,622 **

**Revised due to recent revisions in the OPSNET source data.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), January 15, 2020.

Section 2. Demand and Efficiency in the NAS

The NAS is composed of 518 airport towers, 154 terminal radar control (TRACON) facilities (25 stand-alone and 129 combined ATCT), and 25 control centers (21 air route traffic control centers (ARTCC) and 4 combined control facilities (CCF)).

TRACONs handle descending flights received from a center or ascending flights received from an ATC tower (see figure below). Of the 154 TRACONs in the NAS, 129 of them are combined such that the TRACON exists in the same location as the ATC tower. Such facilities include the Miami, Charlotte, and El Paso towers.

Centers handle all en route flights operating on Instrument Flight Rule (IFR) flight plans. Centers receive flights from or hand off flights to other centers throughout the flight's en route phase of operation. They also receive flights or hand off flights to TRACONs when flights enter or exit the en route phase of operation.

The report reveals the demand observed at some of the busiest facilities, represented by the Core 30 airport towers, the 25 stand-alone TRACONs, and all 25 centers (which include 4 CCFs). Efficiency is also reported based on the following metrics:

Number of Flights at Any Given Minute

Average Hourly Capacity

Average Daily Capacity

Average Number of Level-Offs

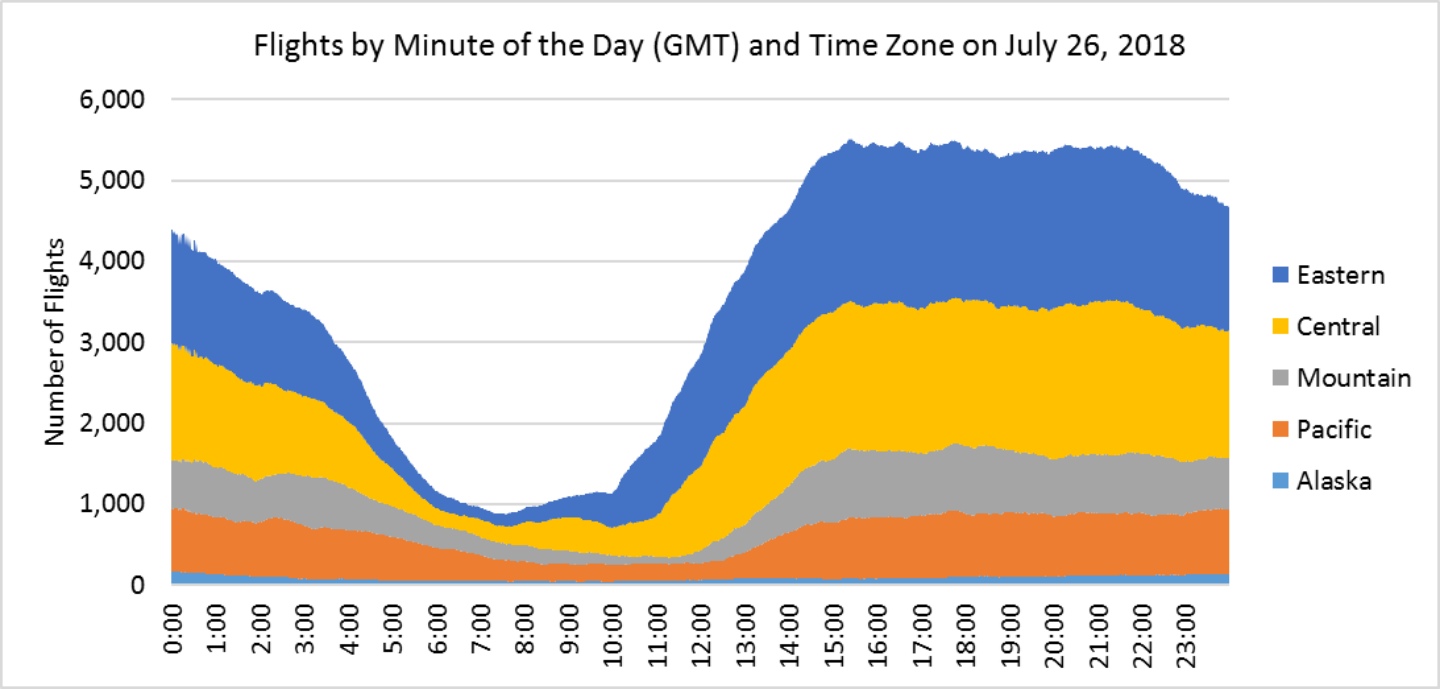
Average Level Flight Distance from TOD to Arrival

Number of IFR Flights at Any Given Minute during Peak Operational Times

5,000 Flights

Traffic flow management system (TFMS) flight data were used to determine the number of flights en route every minute of the day and by U.S. time zone on July 26, 2018. Peak operational times in the NAS range between 1500 GMT and 2200 GMT. During peak operational times in the NAS on that day, there were approximately **5,400** flights en route in the NAS every minute.

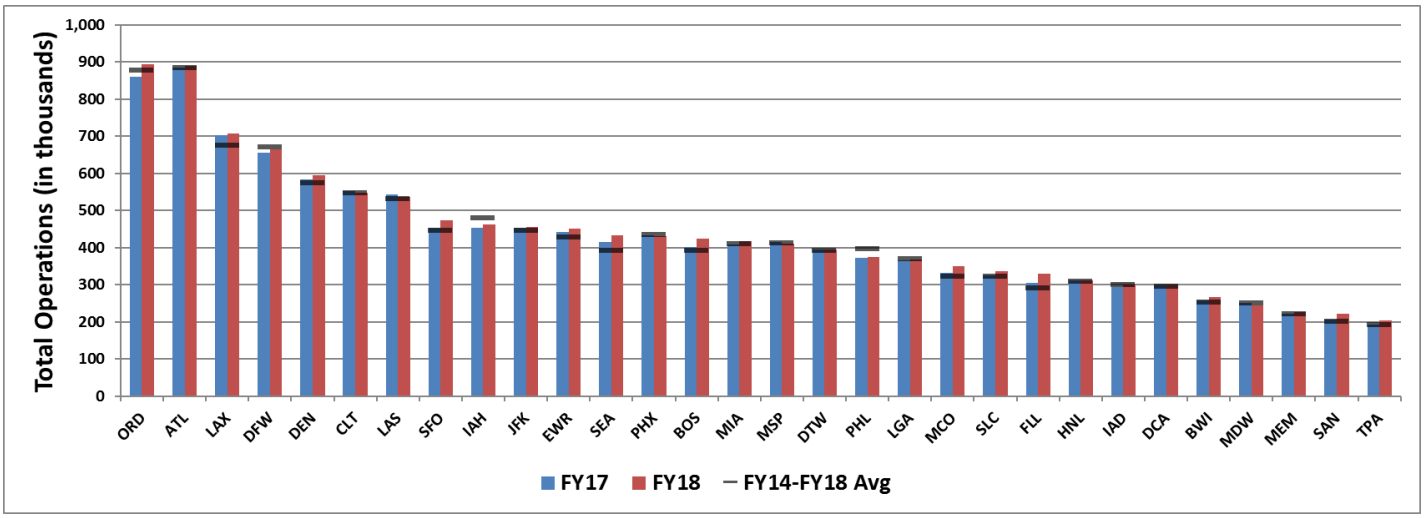
The figure below shows the average number of flights en route per minute and flights under air traffic control within a time zone. The Eastern Time zone has the largest share of flights in the NAS on average and, in this analysis, also includes flights under air traffic control from Puerto Rico and Bermuda. The Pacific Time Zone category includes all west coast air traffic as well as oceanic operations controlled by Oakland center (ZOA), including Hawaii and Guam.



Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Traffic Flow Management System (TFMS), March 5, 2019.

Core 30 Airport Tower Operations

Airport operations are the sum of the number of airport arrivals and departures. Airport traffic controllers handle such operations. Each flight has a departure and arrival, meaning each flight has two airport operations. In FY2018, Core 30 airport operation numbers from OPSNET rose by 1.8 percent, from 12,782,513 to 13,018,200. Below are airport tower operations for each Core 30 airport for FY2017 and FY2018. Chicago O'Hare (ORD), Atlanta (ATL), and Los Angeles (LAX) experienced the highest number of operations, each with operations above 700,000. Operations at each of these three airports rose. (*See*, the Appendix for explanations of the Core 30 airport codes.)



Total Core 30 Airport Operations			
FY14-18 Avg	**FY17**	**FY18**	**%Change**
12,727,918	12,782,513	13,018,200	1.8%

Airport	Rank*	FY14-18 Avg	FY17	FY18
ATL	**2**	885,310	884,734	889,724
BOS	**14**	391,820	400,740	422,997
BWI	**26**	253,043	257,525	267,692
CLT	**6**	547,626	552,055	547,705
DCA	**25**	295,755	298,125	297,535
DEN	**5**	574,894	584,240	594,522
DFW	**4**	670,745	655,525	663,524
DTW	**17**	392,192	393,713	394,807
EWR	**11**	427,414	441,039	450,711
FLL	**22**	290,421	305,531	329,874
HNL	**23**	310,379	312,300	311,212
IAD	**24**	300,928	293,860	300,947
IAH	**9**	481,203	452,158	462,645
JFK	**10**	447,531	454,199	456,377
LAS	**7**	531,533	543,665	537,411

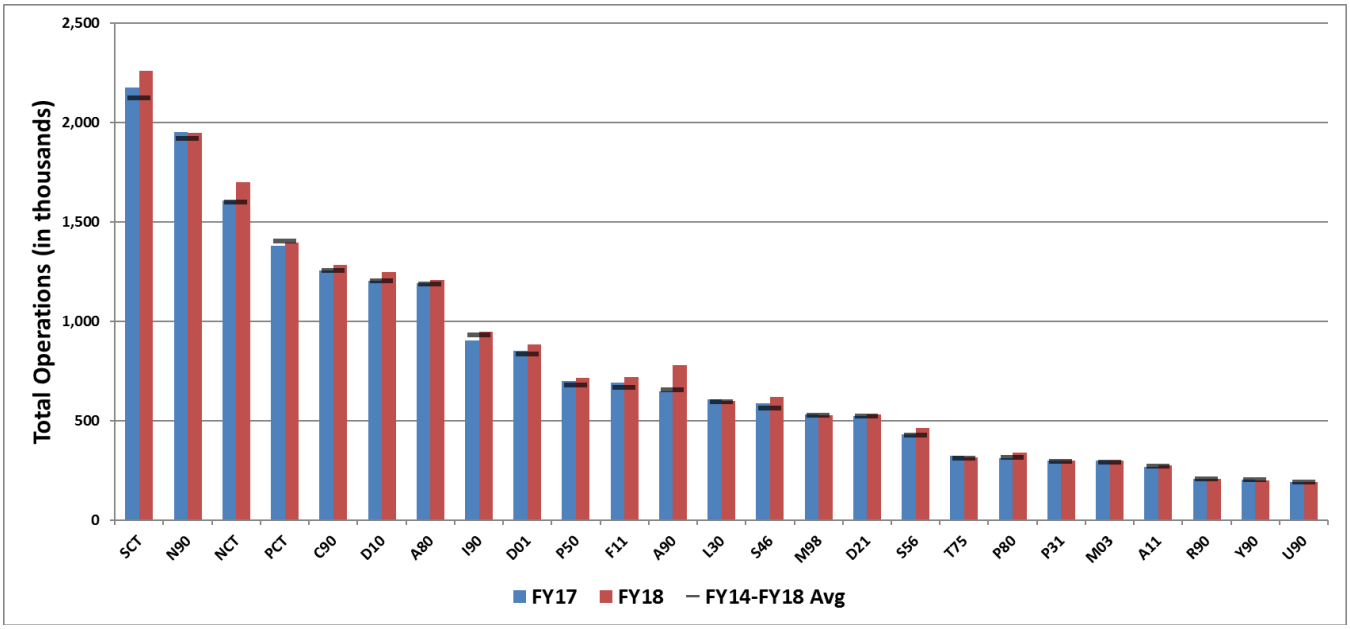
Airport	Rank*	FY14-18 Avg	FY17	FY18
LAX	**3**	675,343	702,912	706,513
LGA	**19**	369,741	366,247	367,937
MCO	**20**	322,273	332,454	349,275
MDW	**27**	250,437	251,692	245,178
MEM	**28**	222,438	222,271	225,357
MIA	**15**	410,721	408,842	417,902
MSP	**16**	411,795	415,406	409,982
ORD	**1**	877,009	859,271	893,497
PHL	**18**	396,438	371,901	375,311
PHX	**13**	434,928	432,025	431,397
SAN	**29**	201,267	205,017	221,821
SEA	**12**	392,005	414,009	433,778
SFO	**8**	446,974	453,397	473,148
SLC	**21**	323,820	325,093	335,267
TPA	**30**	191,935	192,567	204,154

*Ranked by FY18 operations.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), January 31, 2019.

Stand-Alone Terminal Radar Control (TRACON) Facilities

TRACON operations are the count of IFR and VFR itinerant operations passed to and from area airports or centers, including overflights through TRACON airspace. In FY2018, among the 25 stand-alone TRACONs, operations rose by 3.2 percent, from 19.3 million in FY2017 to 20.0 million in FY2018. Below are operation counts for each of the 25 stand-alone TRACONs for FY2017 and FY2018. Southern California (SCT), New York (N90), and Northern California (NCT) had the highest number of operations, each with operations above 1.6 million. Operations at Southern and Northern California grew, while New York operations fell. (*See*, the Appendix for explanations of the TRACON facility codes.)



Total Stand-Alone TRACON Operations			
FY14-18 Avg	FY17	FY18	%Change
19,187,185	19,345,882	19,964,693	3.2%

TRACON	Rank*	FY14-18 Avg	FY17	FY18
A11	22	271,794	267,751	277,054
A80	7	1,186,514	1,193,926	1,208,683
A90	10	656,159	649,110	780,137
C90	5	1,256,948	1,255,922	1,285,189
D01	9	834,160	850,930	884,283
D10	6	1,203,136	1,202,735	1,246,057
D21	15	522,805	523,154	532,512
F11	11	668,901	692,938	719,056
I90	8	930,411	903,379	948,029
L30	14	596,760	609,118	597,930
M03	21	293,060	297,172	297,455
M98	16	527,787	530,741	527,669
N90	2	1,920,039	1,953,663	1,949,918

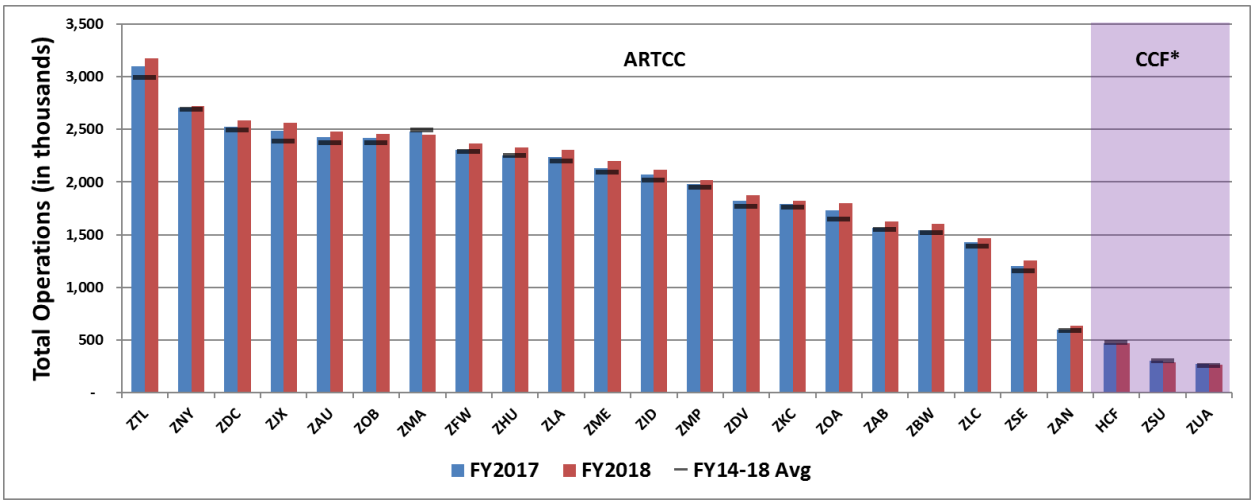
TRACON	Rank*	FY14-18 Avg	FY17	FY18
NCT	3	1,600,940	1,607,203	1,699,904
P31	20	295,601	298,804	300,153
P50	12	680,812	699,983	714,858
P80	18	313,184	312,791	340,851
PCT	4	1,405,816	1,378,247	1,395,390
R90	23	205,792	207,429	207,008
S46	13	563,657	587,978	620,734
S56	17	425,228	431,241	461,517
SCT	1	2,124,339	2,176,421	2,262,881
T75	19	311,087	322,354	315,881
U90	25	190,089	191,046	190,962
Y90	24	202,168	201,846	200,582

*Ranked by FY2018 operations.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), January 31, 2019.

Air Route Traffic Control Centers (ARTCC) and Combined Control Facilities (CCF)

ARTCC or en route operations are the count of IFR and VFR itinerant operations passing to and from a TRACON to a center, or from one center to another center, or from a center to a TRACON. It includes U.S. overflights and oceanic traffic through center air space that do not arrive at or depart from U.S. territory. In FY2018, en route operation numbers for the 21 ARTCC and 3 CCFs rose by 2.3 percent, from 43.9 to 44.9 million. Below are operation counts by center for FY2017 and FY2018. Atlanta (ZTL), New York (ZNY), DC (ZDC), and Jacksonville (ZJX) reported the highest number of operations, each with more than 2.5 million. (*See*, the Appendix for explanations of the ARTCC and CCF codes.)



Total ARTCC & CCF Operations			
FY14-18 Avg	**FY17**	**FY18**	**%Change**
43,046,524	43,857,291	44,880,166	2.3%

Center	Rank**	FY14-18 Avg	FY17	FY18
HCF	**22**	477,161	471,946	468,112
ZAB	**17**	1,547,142	1,566,140	1,622,152
ZAN	**21**	589,627	595,686	639,323
ZAU	**5**	2,372,603	2,422,857	2,477,119
ZBW	**18**	1,518,257	1,545,695	1,600,563
ZDC	**3**	2,495,335	2,527,500	2,587,988
ZDV	**14**	1,769,852	1,819,597	1,875,544
ZFW	**8**	2,288,959	2,308,606	2,363,877
ZHU	**9**	2,255,113	2,250,740	2,325,064
ZID	**12**	2,020,186	2,068,296	2,117,531
ZJX	**4**	2,391,081	2,485,788	2,563,215
ZKC	**15**	1,762,368	1,792,081	1,824,270

Center	Rank**	FY14-18 Avg	FY17	FY18
ZLA	**10**	2,199,832	2,240,289	2,308,125
ZLC	**19**	1,392,813	1,429,054	1,469,792
ZMA	**7**	2,494,148	2,480,528	2,451,898
ZME	**11**	2,091,211	2,131,376	2,202,717
ZMP	**13**	1,947,374	1,977,176	2,019,408
ZNY	**2**	2,694,060	2,706,705	2,718,612
ZOA	**16**	1,651,093	1,734,144	1,802,863
ZOB	**6**	2,374,333	2,415,492	2,459,487
ZSE	**20**	1,159,611	1,206,438	1,252,613
ZSU	**23**	301,988	304,548	289,940
ZTL	**1**	2,991,713	3,101,809	3,177,291
ZUA	**24**	260,663	274,800	262,662

*Data for CCF JCF are not available.

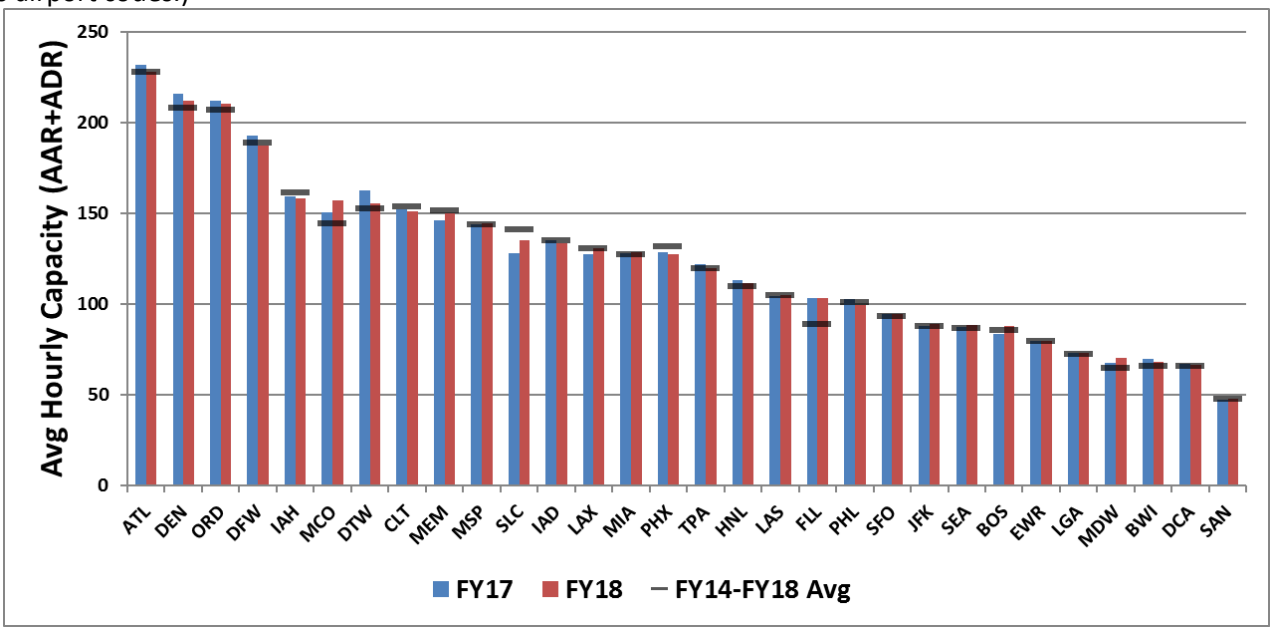
**Ranked by FY2018 operations.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), February 1, 2019.

Average Hourly Capacity (Called Rate) at Core 30 Airports

In general, airport capacity is determined by its runways and surrounding airspace. For the purpose of this report, capacity is represented by an airport's called rates for reportable hours.

In FY2018, ASPM data for the Core 30 airports show that the highest average hourly called rates are at Atlanta (ATL), Denver (DEN), and Chicago O'Hare (ORD). Each had an average called rate of over 200 operations per hour. The highest increases occurred at Boston (BOS) and Salt Lake City (SLC) (up 5.5 percent). (*See*, the Appendix for explanations of the Core 30 airport codes.)



AHC Across All Core 30 Airports			
FY14-18 Avg	FY17	FY18	%Change
3,679	3,716	3,713	-0.1%

Airport	Rank*	FY14-18 Avg	FY17	FY18
ATL	1	228	232	228
BOS	24	85	83	88
BWI	28	66	70	68
CLT	8	154	152	151
DCA	29	66	67	66
DEN	2	208	216	212
DFW	4	189	193	187
DTW	7	153	163	156
EWR	25	79	80	79
FLL	19	89	103	103
HNL	17	110	113	111
IAD	12	135	135	133
IAH	5	161	159	158
JFK	22	88	88	89
LAS	18	105	105	105

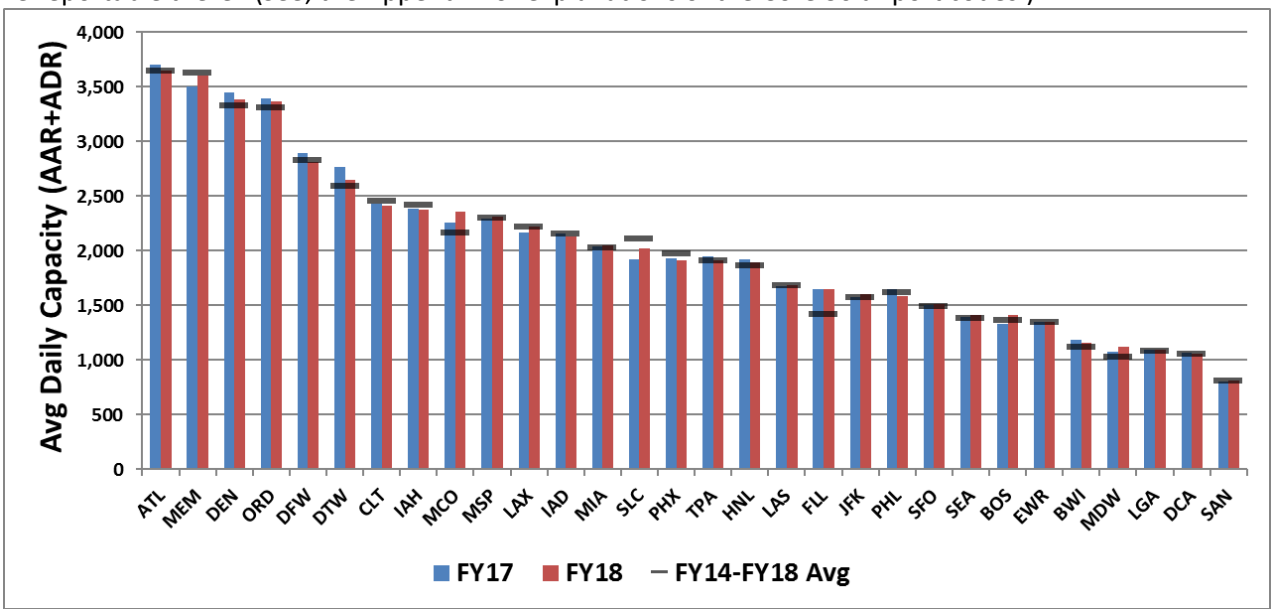
Airport	Rank*	FY14-18 Avg	FY17	FY18
LAX	13	131	128	131
LGA	26	73	73	73
MCO	6	144	151	157
MDW	27	65	68	70
MEM	9	151	146	150
MIA	14	127	128	128
MSP	10	144	144	145
ORD	3	207	212	210
PHL	20	101	103	99
PHX	15	132	129	128
SAN	30	48	47	48
SEA	23	87	87	89
SFO	21	93	94	95
SLC	11	141	128	135
TPA	16	120	122	120

*Ranked by FY2018 call rates.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Aviation System Performance Metrics (ASPM), March 6, 2019.

Average Daily Capacity (ADC) - Based on Called Rates at Core 30 Airports

In general, airport capacity is determined by its runways and surrounding airspace. For the purposes of this report, capacity is represented by the airport's called rates for reportable hours. ADC is the ATO's official tracking method for determining an airport's capacity during a day. In FY2018, ASPM data for the Core 30 airports show that the highest ADCs are found at Atlanta (ATL), Memphis (MEM), Denver (DEN), and Chicago O'Hare (ORD); each with an average of over 3,000 operations per day. Note that ADC is larger for Memphis (MEM) than most other airports because all 24 hours are reportable there. (*See*, the Appendix for explanations of the Core 30 airport codes.)



ADC Across All Core 30 Airports			
FY14-18 Avg	FY17	FY18	%Change
60,001	60,569	60,537	-0.1%

Airport	Rank*	FY14-18 Avg	FY17	FY18
ATL	1	3,646	3,706	3,645
BOS	24	1,367	1,335	1,409
BWI	26	1,123	1,185	1,159
CLT	7	2,458	2,434	2,415
DCA	29	1,055	1,072	1,063
DEN	3	3,334	3,452	3,389
DFW	5	2,831	2,893	2,810
DTW	6	2,597	2,765	2,646
EWR	25	1,351	1,353	1,351
FLL	19	1,426	1,648	1,651
HNL	17	1,871	1,923	1,894
IAD	12	2,160	2,161	2,132
IAH	8	2,419	2,385	2,375
JFK	20	1,579	1,578	1,602
LAS	18	1,682	1,674	1,682

Airport	Rank*	FY14-18 Avg	FY17	FY18
LAX	11	2,219	2,169	2,225
LGA	28	1,090	1,092	1,099
MCO	9	2,164	2,259	2,357
MDW	27	1,033	1,081	1,124
MEM	2	3,634	3,508	3,600
MIA	13	2,035	2,044	2,052
MSP	10	2,301	2,299	2,313
ORD	4	3,312	3,394	3,363
PHL	21	1,619	1,647	1,587
PHX	15	1,974	1,930	1,914
SAN	30	809	807	811
SEA	23	1,390	1,395	1,417
SFO	22	1,493	1,508	1,515
SLC	14	2,115	1,919	2,025
TPA	16	1,917	1,953	1,912

*Ranked by FY2018 daily capacity.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Aviation System Performance Metrics (ASPM), March 6, 2019.

Section 3. NAS Delay, Diversions, Go-Arounds, and Cancellations

Only flights departing from or arriving at their destination at least 15 minutes late are counted as a NAS system delay. The charts that appear below are based on OPSNET numbers, ATO's official source for delay data. Many factors contribute to delay, with weather is the most frequently cited reason. Delay imposes stress on the NAS, the air traffic controllers, passengers, and the economy.

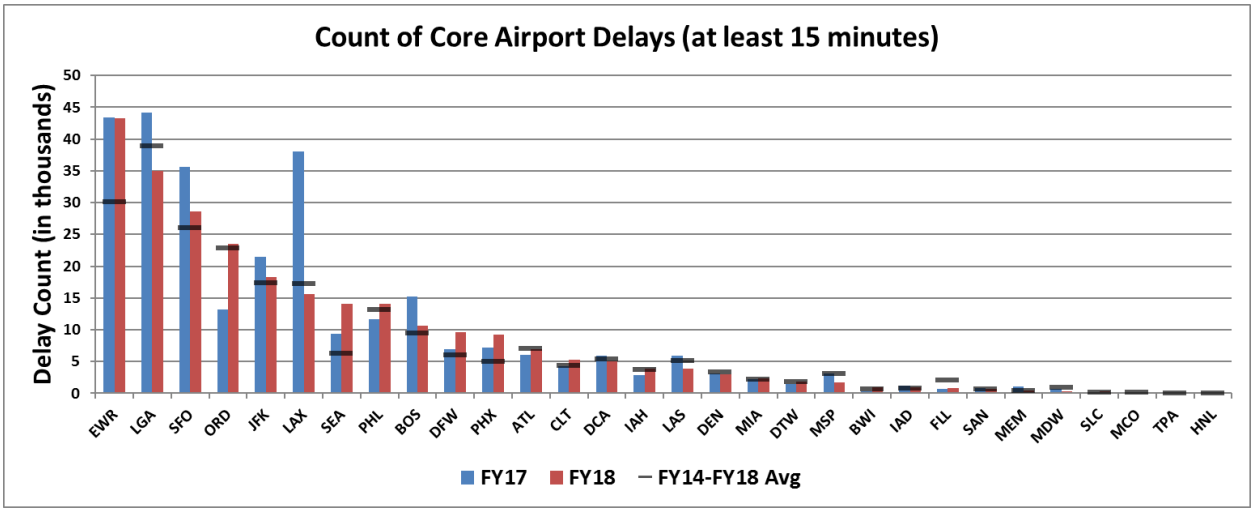
Diversions occur when a flight is routed to a different airport than its original destination. This occurs usually due to convective weather. Other less frequent reasons for diversions are medical emergencies, security, issues with the aircraft, or issues with passengers or crewmembers.

Go-Arounds occur when an aircraft is on approach to the runway but suddenly aborts the landing. This occurs if there is a sudden shift in the wind, an obstruction on the runway, or possibly, the aircraft inadvertently overshooting the runway. Go-arounds result in the aircraft returning to the landing queue to attempt another landing.

Cancellations can occur for numerous reasons either due to weather, extensive delays in the system, equipment issues, etc. Air carriers cancel their own flights in response to these issues. Since the three-hour tarmac rule was imposed after 2010, more flights have been cancelled. This increase in cancellations means reductions in the number of recorded delays.

Counts of NAS Delay at Core 30 Airports

For FY2018, OPSNET data show that the number of Core 30 airport departure delays of at least 15 minutes decreased 9 percent. In FY2017 and FY2018, there were 286,127 and 260,325 delays, respectively. According to the graph and table below, in FY2018, delays were highest at Newark (EWR), LaGuardia (LGA), San Francisco (SFO), and Chicago O'Hare (ORD) each with over 20,000 delays. Together these four airports accounted for one-half of all Core 30 airport delays. (*See*, the Appendix for explanations of the Core 30 airport codes.)



Core 30 Total Delay Counts			
FY14-18 Avg	**FY17**	**FY18**	**%Change**
235,345	286,127	260,325	-9.0%

Airport	Rank*	FY14-18 Avg	FY17	FY18
ATL	**12**	7,063	5,985	6,973
BOS	**9**	9,522	15,191	10,600
BWI	**21**	715	326	933
CLT	**13**	4,392	4,215	5,321
DCA	**14**	5,459	5,975	5,038
DEN	**17**	3,399	3,144	2,999
DFW	**10**	6,023	6,903	9,612
DTW	**19**	1,811	1,392	1,846
EWR	**1**	30,176	43,426	43,244
FLL	**23**	2,091	688	774
HNL	**30**	47	70	30
IAD	**22**	807	1,212	912
IAH	**15**	3,744	2,799	3,902
JFK	**5**	17,424	21,472	18,229
LAS	**16**	5,126	5,907	3,862

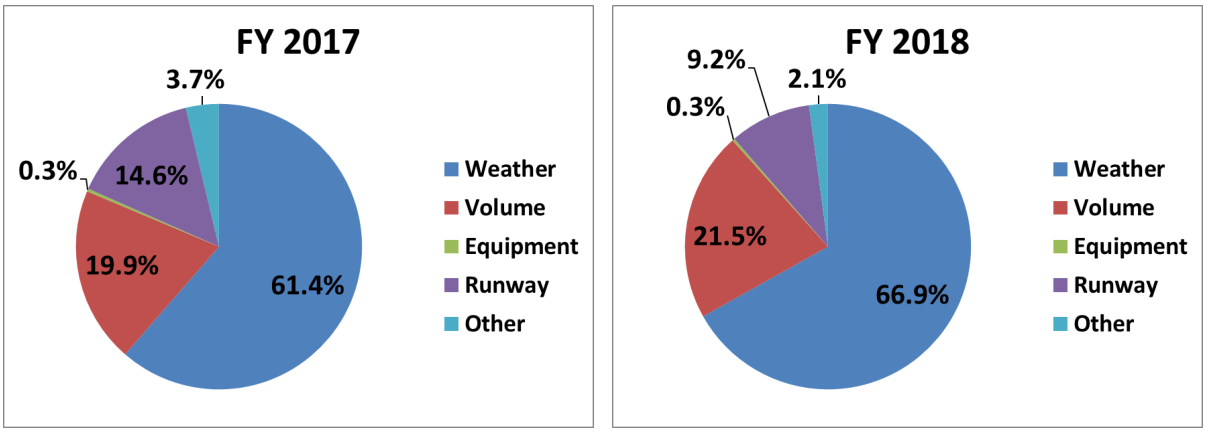
Airport	Rank*	FY14-18 Avg	FY17	FY18
LAX	**6**	17,273	38,073	15,606
LGA	**2**	38,927	44,182	34,922
MCO	**28**	180	153	224
MDW	**26**	917	694	271
MEM	**25**	477	1,113	376
MIA	**18**	2,245	2,186	2,328
MSP	**20**	3,095	3,086	1,704
ORD	**4**	22,853	13,180	23,539
PHL	**8**	13,229	11,597	14,047
PHX	**11**	5,031	7,146	9,218
SAN	**24**	665	808	747
SEA	**7**	6,269	9,386	14,072
SFO	**3**	26,119	35,602	28,652
SLC	**27**	182	187	244
TPA	**29**	85	29	100

*Ranked by number of FY2018 delays.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), February 25, 2019.

Delays by Category

The two charts below show the sources of delays at Core 30 airports by type of delay.



Note: System impact delays are delays assigned to causal facilities in OPSNET, composed of TMI to delays, departure delays, and airborne delays. System impact delays are also the basis for delays by class and delays by cause in OPSNET. (http://aspmhelp.faa.gov/index.php/OPSNET_Reports:_Definitions_of_Variables)

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), February 25, 2019.

Total Cost of Delay

The total cost of flight delays is the sum of costs to airlines, passengers, lost demand, and indirect costs. Office of Performance Analysis estimates show in 2018, the cost of delayed flights increased by 6 percent, from $26.6 to $28.2 billion, an increase of $1.6 billion. Most of this rise was due to an increase in the impact of delays on passengers, from $14.8 to $16.1 billion, a $1.3 billion difference. Between 2012 and 2018, the annual total cost rose from $19.2 to $28.2 billion, an increase of $9 billion. The cost to passengers accounted for $6.4 billion of this increase.

$Billions	2012	2013	2014	2015	2016	2017	2018
Airlines[1]	5.7	6.0	5.8	5.8	5.6	6.4	6.4
Passengers[2]	9.7	11.0	10.5	13.3	13.3	14.8	16.1
Lost Demand[3]	1.3	1.4	1.4	1.8	1.8	2.0	2.1
Indirect[4]	2.5	2.7	2.6	3.1	3.0	3.4	3.6
Total	**19.2**	**21.1**	**20.3**	**24.0**	**23.7**	**26.6**	**28.2**

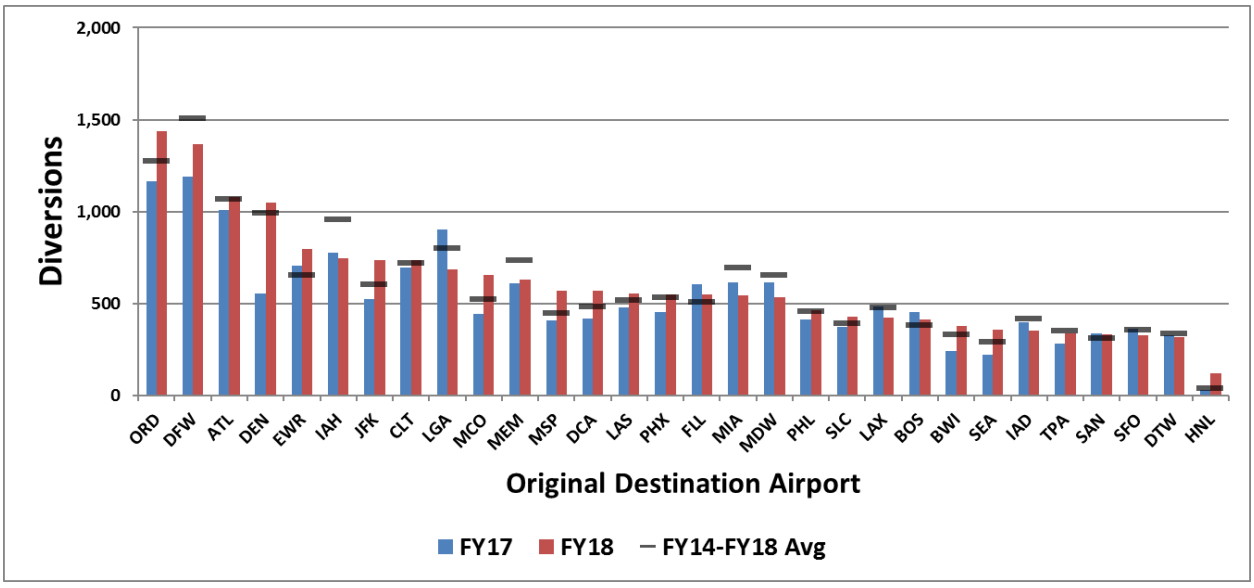
Notes:

1. **Airlines** (cost of delay to airlines): Increased expenses for crew, fuel, maintenance, etc.
2. **Passengers** (cost of delay to passengers): Time lost due to schedule buffer, delayed flights, flight cancellations, and missed connections.
3. **Lost Demand** (cost of passenger decisions to avoid future air travel): Estimated welfare loss incurred by passengers who avoid future air travel as the result of delays.
4. **Indirect** (indirect cost of delay): Other business sectors depend on air travel for transportation. Air travel delays impact these sectors by increasing costs in terms of dollars and time.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), February 15, 2019.

Diversions at Core 30 Airports

The airports reported below are the original intended destinations for the diverted aircraft. Increases in the number of diversions can indicate capacity issues at the airport due to weather, construction, or volume. Over all Core 30 airports, ASPM data show the number of diversions rose by 12.1 percent in FY2018. Consistent with the graph and table below, there was an 88.5 percent increase in diversions for aircraft destined for Denver (DEN), a 63.8 percent increase at Seattle (SEA), and a 55.4 percent increase at Baltimore (BWI). (*See*, the Appendix for explanations of the Core 30 airport codes.)



Core 30 Total Diversions			
FY17-18 Avg	FY17	FY18	%Change
17,826	16,061	18,010	12.1%

Airport	Rank*	FY14-18 Avg	FY17	FY18
ATL	3	1,066	1,007	1,077
BOS	22	384	454	410
BWI	23	332	242	376
CLT	8	720	694	736
DCA	13	482	417	568
DEN	4	991	556	1,048
DFW	2	1,508	1,192	1,368
DTW	29	335	327	317
EWR	5	655	704	797
FLL	16	509	603	546
HNL	30	40	30	121
IAD	25	415	395	354
IAH	6	956	774	745
JFK	7	606	522	737
LAS	14	519	480	553

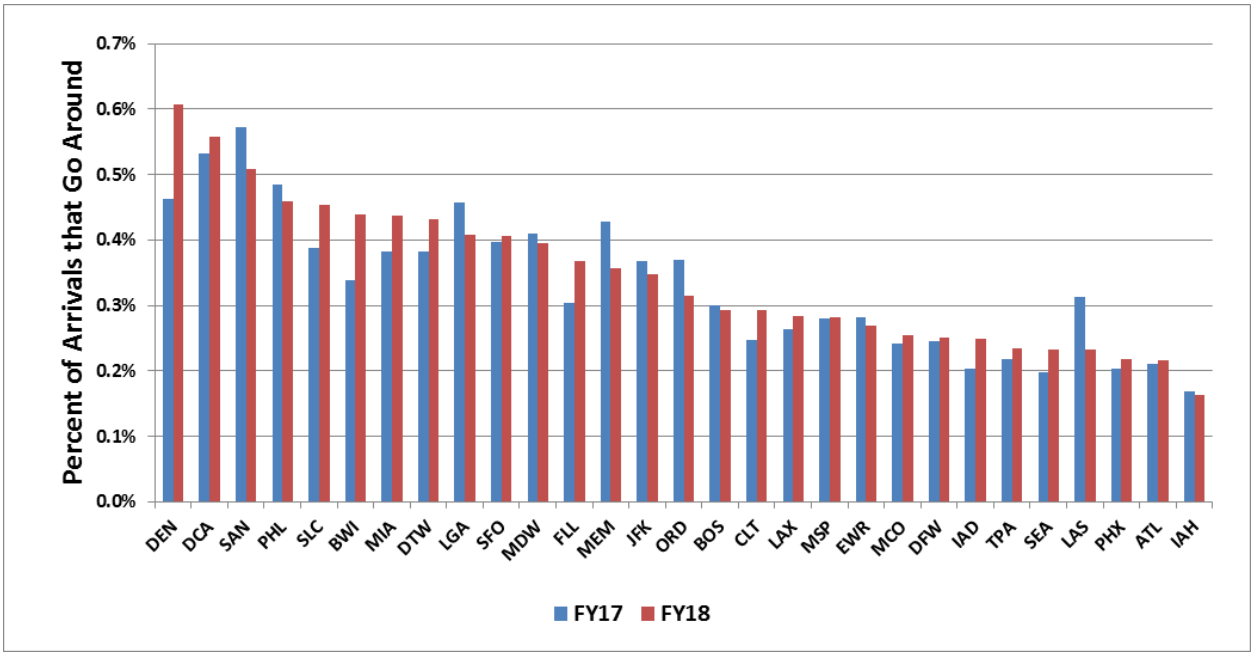
Airport	Rank*	FY14-18 Avg	FY17	FY18
LAX	21	477	482	421
LGA	9	800	903	683
MCO	10	523	441	652
MDW	18	653	614	535
MEM	11	737	609	629
MIA	17	697	616	543
MSP	12	449	405	570
ORD	1	1,274	1,162	1,435
PHL	19	459	410	461
PHX	15	535	451	550
SAN	27	313	339	332
SEA	24	289	218	357
SFO	28	358	361	325
SLC	20	394	373	428
TPA	26	351	280	336

*Ranked by number of FY2018 diversions.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Aviation System Performance Metrics (ASPM), March 4, 2019.

Go-Arounds at Core 30 Airports

FY2017 and FY2018 go-arounds as a percent of arrivals at each Core 30 airport (except Honolulu) appear below. In FY2018, go-arounds at each Core 30 airport did not exceed 0.6 percent; average go-arounds across all Core 30 airports were 0.3 percent. For each year from, FY2014 to FY2018, go-arounds averaged 0.3 percent. These estimates are based from ASPM and CountOps data. (*See*, the Appendix for explanations of the Core 30 airport codes.)



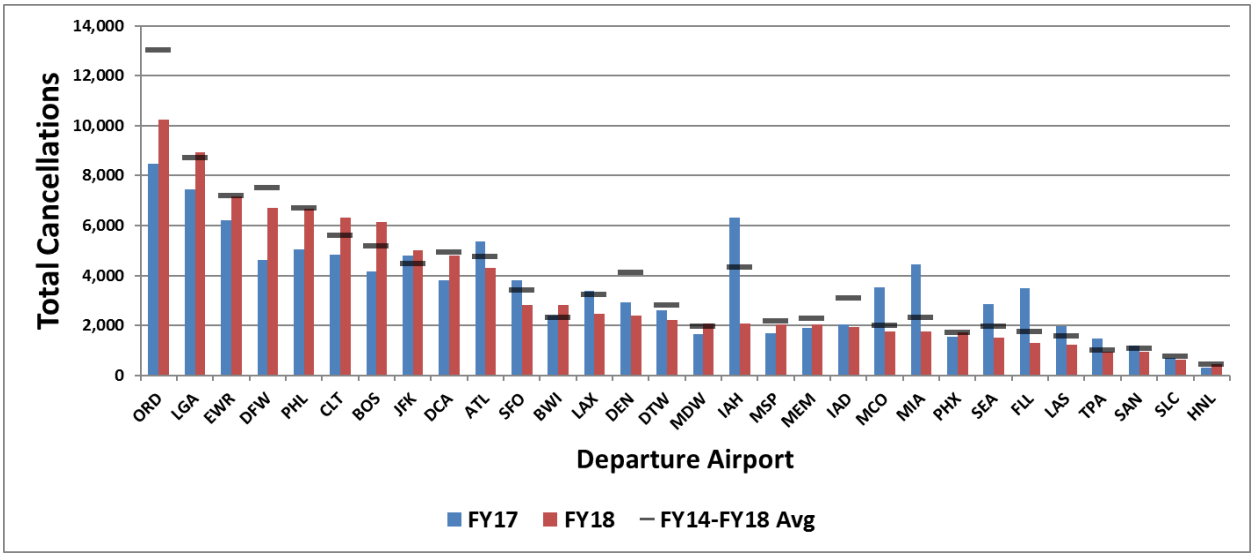
Airport	FY14-18 Avg	FY17	FY18
ATL	0.2%	0.5%	0.6%
BOS	0.2%	0.5%	0.6%
BWI	0.4%	0.6%	0.5%
CLT	0.2%	0.5%	0.5%
DCA	0.5%	0.4%	0.5%
DEN	0.4%	0.3%	0.4%
DFW	0.2%	0.4%	0.4%
DTW	0.4%	0.4%	0.4%
EWR	0.2%	0.5%	0.4%
FLL	0.3%	0.4%	0.4%
IAD	0.2%	0.4%	0.4%
IAH	0.2%	0.3%	0.4%
JFK	0.4%	0.4%	0.4%
LAS	0.2%	0.4%	0.3%
LAX	0.2%	0.4%	0.3%

Airport	FY14-18 Avg	FY17	FY18
LGA	0.5%	0.3%	0.3%
MCO	0.3%	0.2%	0.3%
MDW	0.4%	0.3%	0.3%
MEM	0.4%	0.3%	0.3%
MIA	0.4%	0.3%	0.3%
MSP	0.2%	0.2%	0.3%
ORD	0.3%	0.2%	0.3%
PHL	0.4%	0.2%	0.2%
PHX	0.2%	0.2%	0.2%
SAN	0.6%	0.2%	0.2%
SEA	0.2%	0.3%	0.2%
SFO	0.4%	0.2%	0.2%
SLC	0.4%	0.2%	0.2%
TPA	0.2%	0.2%	0.2%

Sources: Go-arounds: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Aviation System Performance Metrics (ASPM), March 5, 2019; Arrivals: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), CountOps, March 5, 2019.

Cancellations at Core 30 Airports

Flight cancellation data come from ASPM. In FY2018, flight departure cancellations at Core 30 airports decreased 3.4 percent. As mentioned previously, cancellations may be due to weather, system delays, equipment issues, or other reasons. The graph and table below show flight cancellations at Core 30 airports for FY2017 and FY2018. The airports with the highest number of cancellations were Chicago O'Hare (ORD), LaGuardia (LGA), Newark (EWR), and Dallas-Fort Worth (DFW). Each had over 6,000 cancellations and together accounted for almost 33 percent of Core 30 airport cancellations. (*See*, the Appendix for explanations of the Core 30 airport codes.)



Core 30 Total Cancellations			
FY14-18 Avg	FY17	FY18	%Change
112,602	104,917	101,303	-3.4%

Airport	FY14-18 Avg	FY17	FY18
ATL	4,751	5,355	4,305
BOS	5,180	4,142	6,150
BWI	2,312	2,398	2,802
CLT	5,617	4,829	6,301
DCA	4,949	3,797	4,780
DEN	4,107	2,930	2,397
DFW	7,530	4,611	6,711
DTW	2,821	2,591	2,221
EWR	7,183	6,216	7,163
FLL	1,767	3,501	1,312
HNL	443	325	432
IAD	3,117	2,047	1,946
IAH	4,343	6,312	2,060
JFK	4,492	4,806	4,997
LAS	1,587	1,951	1,239

Airport	FY14-18 Avg	FY17	FY18
LAX	3,253	3,380	2,465
LGA	8,715	7,455	8,931
MCO	1,992	3,530	1,773
MDW	1,976	1,656	2,064
MEM	2,272	1,892	2,031
MIA	2,325	4,447	1,747
MSP	2,186	1,693	2,056
ORD	13,024	8,465	10,220
PHL	6,694	5,035	6,667
PHX	1,717	1,530	1,710
SAN	1,082	1,177	928
SEA	1,964	2,857	1,526
SFO	3,413	3,804	2,810
SLC	760	709	622
TPA	1,030	1,476	937

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Aviation System Performance Metrics (ASPM), March 15, 2019.

Section 4. Traffic Management Initiatives

Traffic Management Initiatives (TMIs) are programs and tools that ATC may use to manage air traffic. These initiatives can take a number of forms, depending on the need and situation. Some TMIs are used to manage excess demand or a lowered acceptance rate at a particular airport. Other TMIs are used to manage traffic issues in the en route environment usually caused by convective weather. The TMIs reported in this report include:

Ground Delay Programs (GDP)

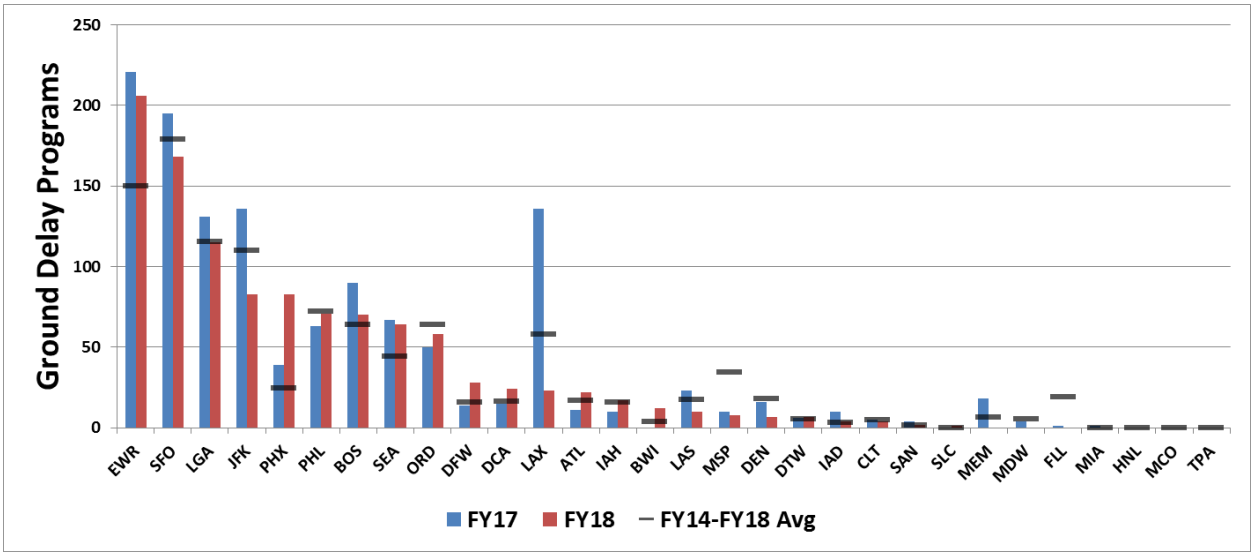
Ground stops (GS)

Airspace Flow Programs (AFP)

Holdings

Ground Delay Programs at Core 30 Airports

A ground delay program (GDP) is a TMI where aircraft are delayed at their departure airport in order to reconcile demand with capacity at their arrival airport. They are airport-specific, therefore, each GDP is reported for a particular airport. In FY2018, OPSNET data shows Newark (EWR), LaGuardia (LGA), and San Francisco (SFO) had the highest number of GDPs. Together, these three airports accounted for 45 percent of Core 30 GDPs. In FY2018, GDPs decreased by 14.8 percent across all Core 30 airports, from 1,276 to 1,087. (*See*, the Appendix for explanations of the Core 30 airport codes.)



Total Core 30 GDPs			
FY14-18 Avg	FY17	FY18	%Change
1,074	1,276	1,087	-14.8%

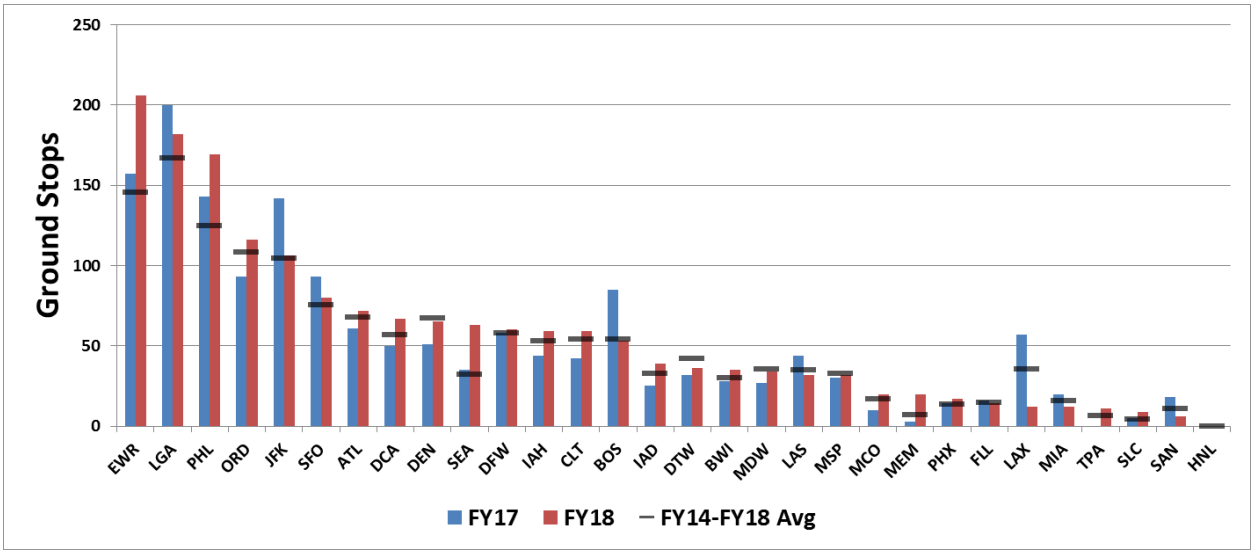
Airport	FY14-18 Avg	FY17	FY18
ATL	17	11	22
BOS	64	90	70
BWI	4	0	12
CLT	5	5	4
DCA	17	15	24
DEN	18	16	7
DFW	16	14	28
DTW	6	6	7
EWR	150	221	206
FLL	19	1	0
HNL	0	0	0
IAD	3	10	4
IAH	16	10	17
JFK	110	136	83
LAS	18	23	10

Airport	FY14-18 Avg	FY17	FY18
LAX	58	136	23
LGA	116	131	115
MCO	0	0	0
MDW	6	4	0
MEM	7	18	0
MIA	0	1	0
MSP	34	10	8
ORD	64	50	58
PHL	72	63	71
PHX	25	39	83
SAN	2	4	2
SEA	45	67	64
SFO	179	195	168
SLC	0	0	1
TPA	0	0	0

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), March 15, 2019.

Ground Stops at Core 30 Airports

Ground stops are the most restrictive form of TMI because they hold all aircraft, within the scope of the ground stop, at their departure airports until conditions at the destination airport allow for their arrival. Ground stops only affect arrivals to a specific airport (not departures) and, like GDPs, are airport-specific. According to OPSNET data, in FY2018, Core 30 airports with the highest number of ground stops were Newark (EWR), LaGuardia (LGA), and Philadelphia (PHL). Ground stops increased by 6.5 percent across all Core 30 airports, from 1,583 to 1,686. (*See*, the Appendix for explanations of the Core 30 airport codes.)



Total Core 30 Ground Stops			
FY14-18 Avg	FY17	FY18	%Change
1,506	1,583	1,686	6.5%

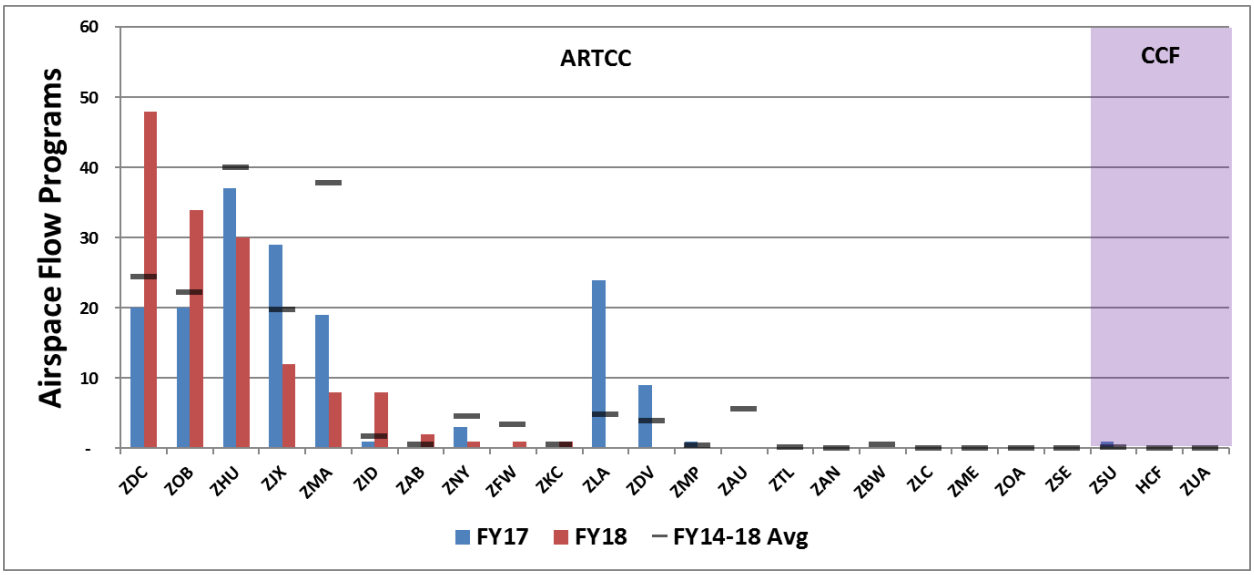
Airport	FY14-18 Avg	FY17	FY18
ATL	68	61	72
BOS	54	85	53
BWI	30	28	35
CLT	54	42	59
DCA	57	50	67
DEN	68	51	65
DFW	58	58	60
DTW	42	32	36
EWR	145	157	206
FLL	15	16	14
HNL	0	0	0
IAD	33	25	39
IAH	53	44	59
JFK	104	142	106
LAS	35	44	32

Airport	FY14-18 Avg	FY17	FY18
LAX	35	57	12
LGA	167	169	182
MCO	17	16	20
MDW	36	21	34
MEM	7	2	20
MIA	16	21	12
MSP	33	27	32
ORD	109	98	116
PHL	125	103	169
PHX	14	17	17
SAN	11	10	6
SEA	32	47	63
SFO	76	78	80
SLC	5	1	9
TPA	6	6	11

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), March 15, 2019.

Airspace Flow Programs by Center

Imagine a line drawn in space in association with a constraint, usually convective weather. Under an airspace flow program, any flights filed that cross the line (usually only in one direction) are assigned an expected departure clearance time (EDCT), to ensure that it arrives at the line, or "boundary," at a time when it can be accommodated. In FY2018, there were 145 airspace flow programs imposed by air traffic managers versus 164 in FY2017, a decrease of 11.6 percent. Over the five years from FY2014 to FY2018, the number of airspace flow programs averaged 171 per year. The graph and table below show airspace flow programs by ARTCC. In FY2018 airspace flow programs mainly affected DC (ZDC), Cleveland (ZOB), Houston (ZHU), and Jacksonville (ZJX). These estimates are based on National Traffic Management Log (NTML) data. (*See*, the Appendix for explanations of the ARTCC and CCF codes.)



* Data for CCF JCF are not available.

Total Centers Air Flow Programs			
FY14-18 Avg	FY17	FY18	%Change
171	164	145	-11.6%

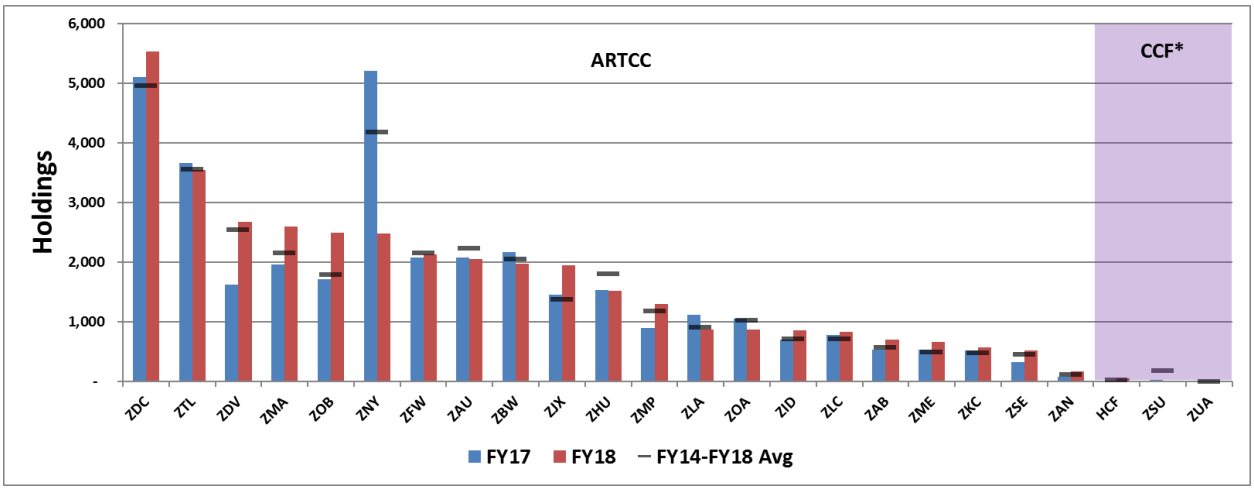
Center	FY14-18 Avg	FY17	FY18
HCF	0	0	0
ZAB	1	0	2
ZAN	0	0	0
ZAU	6	0	0
ZBW	1	0	0
ZDC	24	20	48
ZDV	4	9	0
ZFW	3	0	1
ZHU	40	37	30
ZID	2	1	8
ZJX	20	29	12
ZKC	1	0	1

Center	FY14-18 Avg	FY17	FY18
ZLA	5	24	0
ZLC	0	0	0
ZMA	38	19	8
ZME	0	0	0
ZMP	0	1	0
ZNY	5	3	1
ZOA	0	0	0
ZOB	22	20	34
ZSE	0	0	0
ZSU	0	1	0
ZTL	0	0	0
ZUA	0	0	0

Source: Federal Aviation Administration, Air Traffic Organization, Technical Operations (AJW), National Traffic Management Log (NTML), February 22, 2019.

Holdings by Center

A holding occurs when an aircraft is deliberately delayed en route by flying in a repeating rotational pattern. They are typically implemented when there is traffic congestion or convective weather at the destination airport or an adjacent facility. OPSNET data shows the highest numbers of holdings occur in the DC (ZDC), Atlanta (ZTL), Denver (ZDV), and Miami (ZMA) Air Route Traffic Control Centers (ARTCC). (*See*, the graph and table below.) In FY2018, the number of holdings rose by 3.5 percent. (*See*, the Appendix for explanations of the ARTCC and combined control facilities (CCF).)



* Data for CCF JCF are not available.

Total Center Flight Holdings			
FY14-18 Avg	**FY17**	**FY18**	**%Change**
35,667	35,099	36,317	3.5%

Center	FY14-18 Avg	FY17	FY18
ZAB	571	527	697
ZAN	121	76	165
ZAU	2,234	2,072	2,052
ZBW	2,055	2,168	1,972
ZDC	4,960	5,097	5,533
ZDV	2,548	1,622	2,671
ZFW	2,153	2,074	2,123
ZHU	1,800	1,531	1,524
ZID	719	706	855
ZJX	1,369	1,458	1,944
ZKC	477	518	564
ZLA	902	1,114	870

Center	FY14-18 Avg	FY17	FY18
ZLC	711	783	828
ZMA	2,156	1,954	2,601
ZME	488	537	656
ZMP	1,180	899	1,292
ZNY	4,179	5,200	2,482
ZOA	1,029	1,048	870
ZOB	1,792	1,707	2,495
ZSE	450	321	521
ZTL	3,555	3,662	3,539
ZSU	184	20	15
HCF	28	4	48
ZUA	4	1	0

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), February 1, 2019.

Section 5. Safety Metrics

The U.S. national airspace system is the safest air transportation system in the world. This report presents metrics used to measure the safety of the NAS:

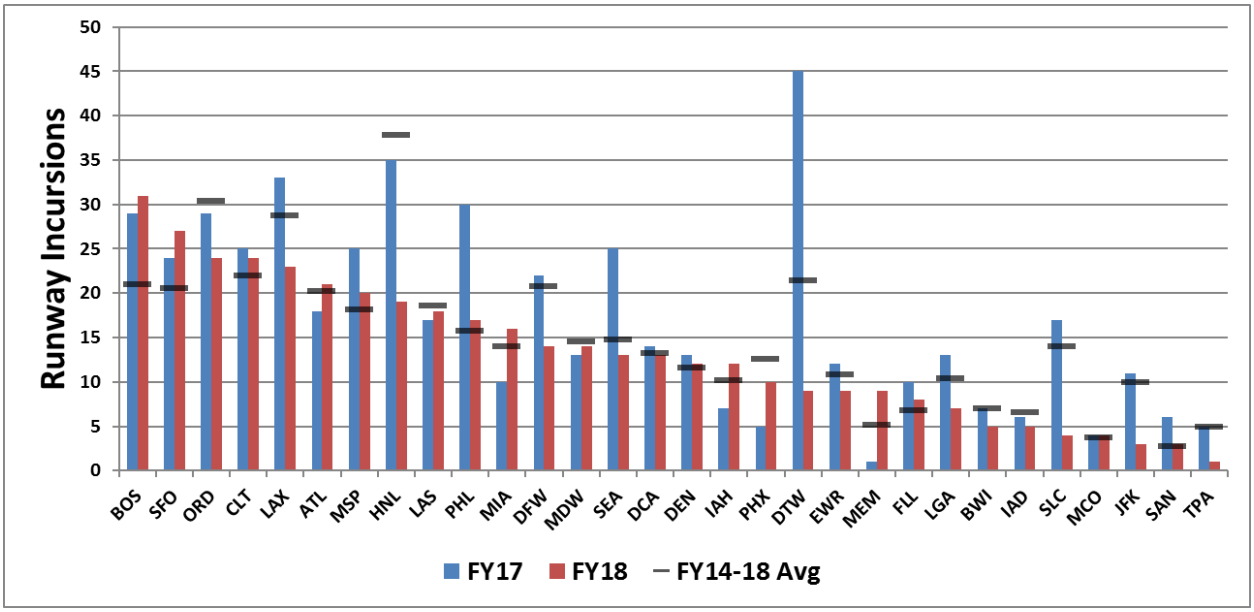
Runway Incursions and Surface Incidents

Incursions by Type

Loss of Standard Separation Count

Runway Incursions and Surface Incidents at Core 30 Airports

A runway incursion is any occurrence involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft. Across all Core 30 airports, the number of runway incursions fell from 513 in FY2017 to 395 in FY2018—a decrease of 22.7 percent. The graph and table below show numbers of runway incursions by airport. The highest number of incursions occurred at Boston (BOS), San Francisco (SFO), Chicago (ORD), and Charlotte (CLT). Incursions by airport and by type appear on the next page. (*See*, the Appendix for explanations of the Core 30 airport codes.)



Core 30 Total Runway Incursions and Surface Incidents			
FY14-18 Avg	FY17	FY18	%Change
449	511	395	-22.7%

Airport	FY14-18 Avg	FY17	FY18
ATL	20	18	21
BOS	21	29	31
BWI	7	7	5
CLT	22	25	24
DCA	13	14	13
DEN	12	13	12
DFW	21	22	14
DTW	21	45	9
EWR	11	12	9
FLL	7	10	8
HNL	38	35	19
IAD	7	6	5
IAH	10	7	12
JFK	10	11	3
LAS	19	17	18

Airport	FY14-18 Avg	FY17	FY18
LAX	29	33	23
LGA	10	13	7
MCO	4	4	4
MDW	15	13	14
MEM	5	1	9
MIA	14	10	16
MSP	18	25	20
ORD	30	29	24
PHL	16	30	17
PHX	13	5	10
SAN	3	6	3
SEA	15	25	13
SFO	21	24	27
SLC	14	17	4
TPA	5	5	1

*Honolulu is coded as HNL or HCF in the source data.

Source: Federal Aviation Administration, Aviation Safety (AVS) (accessed from: FAA Aviation Safety Information Analysis and Sharing (ASIAS), Runway Incursion Database (https://www.asias.faa.gov/apex/f?p=100:28:::NO:28::), February 14, 2019).

Incursions by Type at Core 30 Airports, FY2018

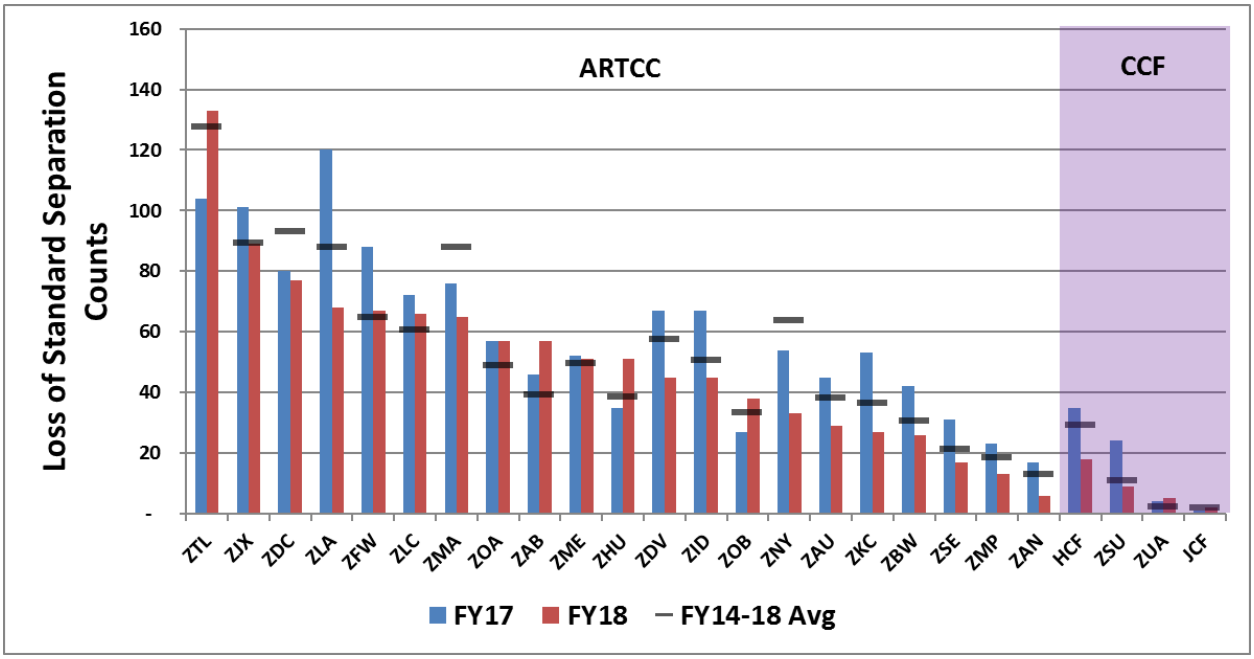
Airport	A	B	C	D	E	P	S	NA
ATL	0	0	12	9	0	0	0	0
BOS	0	0	20	11	0	0	0	0
BWI	0	0	3	2	0	0	0	0
CLT	0	0	18	6	0	0	0	0
DCA	0	0	12	1	0	0	0	0
DEN	0	0	8	4	0	0	0	0
DFW	0	0	5	9	0	0	0	0
DTW	0	0	3	6	0	0	0	0
EWR	0	0	9	0	0	0	0	0
FLL	0	0	5	3	0	0	0	0
HNL	0	0	12	7	0	0	0	0
IAD	0	0	4	1	0	0	0	0
IAH	0	0	7	5	0	0	0	0
JFK	0	0	3	0	0	0	0	0
LAS	0	0	9	9	0	0	0	0
LAX	0	0	20	3	0	0	0	0
LGA	0	0	7	0	0	0	0	0
MCO	0	0	2	2	0	0	0	0
MDW	0	0	9	5	0	0	0	0
MEM	0	0	5	4	0	0	0	0
MIA	0	0	16	0	0	0	0	0
MSP	0	0	13	7	0	0	0	0
ORD	0	0	14	9	1	0	0	0
PHL	0	0	12	5	0	0	0	0
PHX	0	0	9	1	0	0	0	0
SAN	0	0	2	1	0	0	0	0
SEA	0	0	7	6	0	0	0	0
SFO	0	0	17	8	2	0	0	0
SLC	0	0	4	0	0	0	0	0
TPA	0	0	1	0	0	0	0	0

Category A - A serious incident in which a collision was narrowly avoided.
Category B - An incident in which separation decreases and there is a significant potential for collision, which may result in a time critical corrective/evasive response to avoid a collision.
Category C - An incident characterized by ample time and/or distance to avoid a collision.
Category D - An incident that meets the definition of a runway incursion such as incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and take-off of aircraft of aircraft but with no immediate safety consequences.
Category E - An incident in which insufficient or conflicting evidence of the event precludes assigning another category.
Category P - Pending security assessment.
Category S - Not a runway incursion, but a surface incident for which severity is not assessed.
NA - Not available.

Source: Federal Aviation Administration, Aviation Safety (AVS) (accessed from: FAA Aviation Safety Information Analysis and Sharing (ASIAS), Runway Incursion Database (https://www.asias.faa.gov/apex/f?p=100:28:::NO:28::), February 14, 2019).

Loss of Standard Separation Count, by Center

Standard separation is a specified separation minima in between airborne aircraft in controlled airspace. Breaches of such minima are based on Airborne Loss Event data. Losses of standard separation are reported by Air Route Traffic Control Center (ARTCC) below. Across all centers, losses of standard separation fell 17.2 percent in FY2018. The three centers with the highest losses of separation were Atlanta (ZTL), Jacksonville (ZJX), and DC (ZDC). (*See*, the Appendix for explanations of the ARTCC and combined control facilities (CCF).)



Total Losses of Standard Separation			
FY14-18 Avg	FY17	FY18	%Change
1,198	1,321	1,094	-17.2%

Center	FY14-18 Avg	FY17	FY18
HCF	29	35	18
JCF	2	1	2
ZAB	39	46	57
ZAN	13	17	6
ZAU	38	45	29
ZBW	31	42	26
ZDC	93	80	77
ZDV	58	67	45
ZFW	65	88	67
ZHU	39	35	51
ZID	51	67	45
ZJX	89	101	89
ZKC	37	53	27

Center	FY14-18 Avg	FY17	FY18
ZLA	88	120	68
ZLC	61	72	66
ZMA	88	76	65
ZME	50	52	51
ZMP	19	23	13
ZNY	64	54	33
ZOA	49	57	57
ZOB	34	27	38
ZSE	21	31	17
ZSU	11	24	9
ZTL	128	104	133
ZUA	2	4	5

Source: Federal Aviation Administration, Air Traffic Organization, Office of Policy and Performance (AJI-3), unpublished Airborne Loss Event data, March 4, 2019.

Section 6. Other ATO Topics

There are a variety of other aspects of the NAS which are of special interest. This report presents the following:

Flight Service Stations

Commercial Space Launch Activity

Flight Service Stations

Flight Service Stations (FSS) are air traffic facilities that communicate directly with pilots to conduct preflight briefings, flight plan processing, inflight advisory services, search and rescue initiation, and assistance to aircraft in emergencies. FSS also relay air traffic control clearances, process notices to airmen (NOTAMs) and provide updates on aviation meteorological and aeronautical information. All 17 Alaskan flight service stations are Federal facilities and the 6 stations throughout the rest of the country are contracted.

Another service to civil pilots is the direct user access terminal service (DUATS). DUATS is a weather information and flight plan processing service contracted by the FAA. It is a telephone and internet-based system through which pilots can access weather and aeronautical information to help with flight planning.

ALASKA FSS	**Barrow FSS (BRW)** **Cold Bay FSS (CDB)** **Deadhorse FSS (SCC)** **Dillingham FSS (DLG)** **Fairbanks FSS (FAI)** **Homer FSS (HOM)** **Iliamna FSS (ILI)** **Juneau FSS (JNU)** **Kenai FSS (ENA)** **Ketchikan FSS (KTN)** **Kotzebue FSS (OTZ)** **McGrath FSS (MCG)** **Nome FSS (OME)** **Northway FSS (ORT)** **Palmer FSS (LBE)** **Sitka FSS (SIT)** **Talkeetna FSS (TKA)**
ARIZONA FSS	**Prescott LM FSS HUB (PRC)**
DISTRICT OF COLUMBIA FSS	**District of Colum. LM FSS HUB**
FLORIDA FSS	**Miami AIFSS**
MINNESOTA FSS	**Princeton AFSS**
NORTH CAROLINA FSS	**Raleigh-Durham AFSS**
TEXAS FSS	**Fort Worth LM FSS HUB**

FAA Flight Services

FAA Facilities – Alaska Flight Service							
Year	Pilot Briefs	Flight Plans Filed	Preflight Calls	Aircraft Contacts	Airport Advisories	NOTAMs Issued	Total SAR
FY 2015	104,535	199,663	62,847	476,336	296,363	175,165	4,778
FY 2016	101,510	191,767	56,214	490,342	291,224	131,607	4,653
FY 2017	94,553	194,641	52,504	485,847	305,915	135,226	3,662
FY 2018	89,592	210,626	52,200	521,048	325,140	158,003	4,869

FAA Facilities – Contracted Services							
Year	Pilot Briefs	Flight Plans Filed	Preflight Calls	Inflight Contacts	Flight Data Calls	NOTAMs Issued	Total SAR
FY 2015	1,029,623	719,349	1,727,671	391,632	219,659	251,610	No Data
FY 2016	892,170	608,761	1,495,599	326,820	194,712	227,576	3,782*
FY 2017	829,909	515,868	1,344,640	314,363	175,203	216,997	8,145
FY 2018	797,746	462,207	1,255,510	286,392	178,110	216,249	9,337

* Data delivered starting May 2016.

DUATS – Web Services		
Year	Pilot Briefs*	Flight Plans Filed
FY 2015	13,117,576	3,130,797
FY 2016	17,705,259	3,002,163
FY 2017	29,079,619	2,592,214
FY 2018	26,349,042	2,229,961

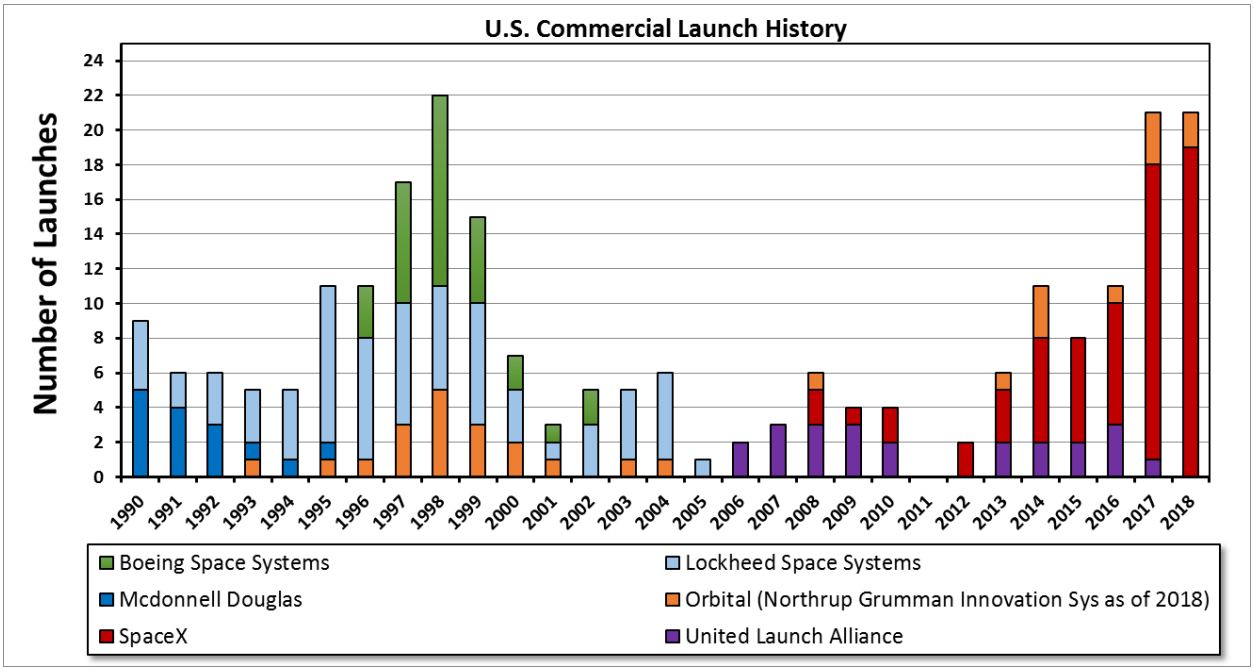
* Number represents the number of hits to DUATs Web Sites/Portals.

United States NOTAM Office (USNOF)		
Year	Domestic	International
FY 2015	1,216,089	561,972
FY 2016	1,327,858	603,930
FY 2017	1,455,238	760,015
FY 2018	1,569,386	874,091

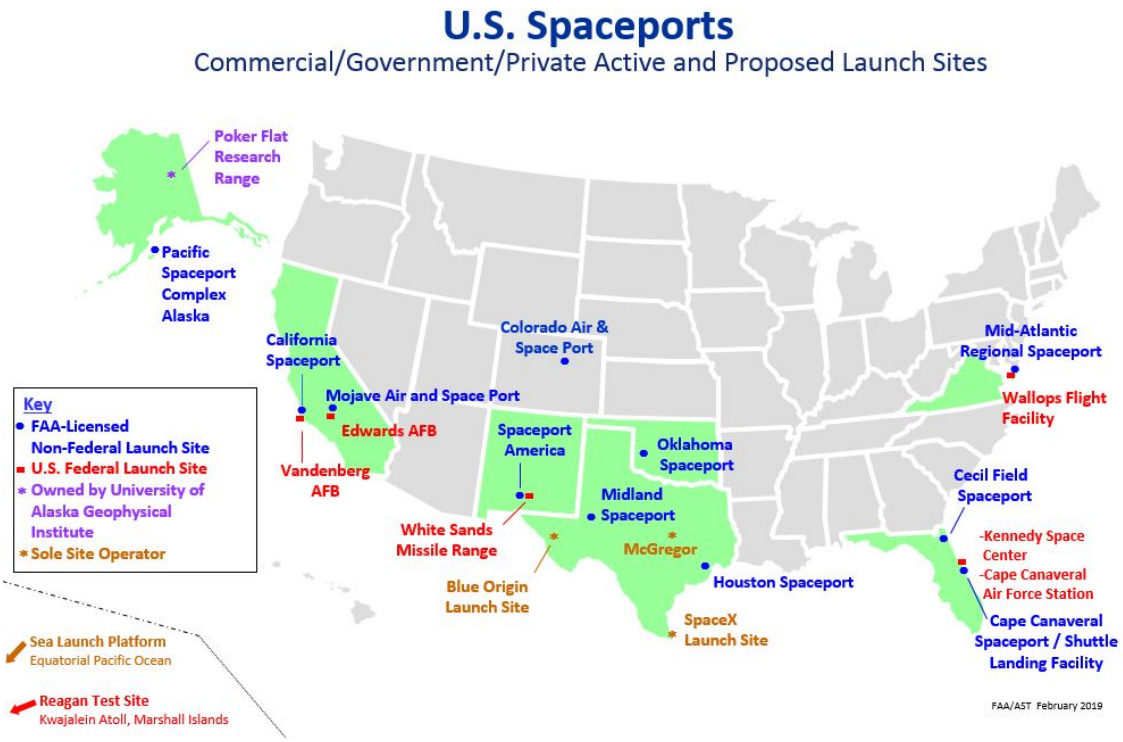
Source: Federal Aviation Administration, Air Traffic Organization, Flight Service (AJR-B), Email communication, December 13, 2018.

Commercial Space Launch Activity

In CY2018, 21 U.S. orbital commercial space launches licensed by FAA took place, the same number as the previous year. Among the 2018 launches, 19 were undertaken by SpaceX and 2 by Orbital (part of Northrup Grumman Innovation Systems as of 2018). (There were 3 other FAA-licensed launches (by the U.S.-based compay Rocket Lab), but those took place in New Zealand, not the U.S.)



Sources: Federal Aviation Administration, Commercial Space Transportation (AST), The Annual Compendium of Commercial Space Transportation, various years; FAA, Commercial Space Transportation (AST), Launches. https://www.faa.gov/data_research/commercial_space_data/launches/?type=license; Commercial Space Transportation (AST), Email communications, March 19-20, 2019; U.S. Dept. of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Table 1-39, February 5, 2018. https://www.bts.gov/browse-statistical-products-and-data/national-transportation-statistics/nts-2017-4th-quarter



Source: Federal Aviation Administration, Commercial Space Transportation (AST), February 2019.

Appendix. Facility Codes

Core 30 Airports

Code	Airport	Code	Airport
ATL	Hartsfield-Jackson Atlanta International	LAX	Los Angeles International
BOS	Boston Logan International	LGA	New York LaGuardia
BWI	Baltimore/Washington International	MCO	Orlando International
CLT	Charlotte Douglas International	MDW	Chicago Midway
DCA	Ronald Reagan Washington National	MEM	Memphis International
DEN	Denver International	MIA	Miami International
DFW	Dallas-Fort Worth International	MSP	Minneapolis/St. Paul International
DTW	Detroit Metropolitan Wayne County	ORD	Chicago O`Hare International
EWR	Newark Liberty International	PHL	Philadelphia International
FLL	Fort Lauderdale/Hollywood International	PHX	Phoenix Sky Harbor International
HNL	Honolulu International	SAN	San Diego International
IAD	Washington Dulles International	SEA	Seattle/Tacoma International
IAH	George Bush Houston Intercontinental	SFO	San Francisco International
JFK	New York John F. Kennedy International	SLC	Salt Lake City International
LAS	Las Vegas McCarran International	TPA	Tampa International

Stand-Alone Terminal Radar Control (TRACON) Facilities

LocID	TRACON	LocID	TRACON
A11	Anchorage TRACON	NCT	Northern California TRACON
A80	Atlanta TRACON	P31	Pensacola TRACON
A90	Boston TRACON	P50	Phoenix TRACON
C90	Chicago TRACON	P80	Portland TRACON
D01	Denver TRACON	PCT	Potomac TRACON
D10	Dallas-Fort Worth TRACON	R90	Omaha TRACON
D21	Detroit TRACON	S46	Seattle TRACON
F11	Central Florida TRACON	S56	Salt Lake City TRACON
I90	Houston TRACON	SCT	Southern California TRACON
L30	Las Vegas TRACON	T75	St Louis TRACON
M03	Memphis TRACON	U90	Tucson TRACON
M98	Minneapolis TRACON	Y90	Yankee TRACON
N90	New York TRACON		

Air Route Traffic Control Centers (ARTCC) and Combined Control Facilities (CCF)

LocID	Center	LocID	Center
HCF	Honolulu Control Facility	ZLA	Los Angeles CA ARTCC
JCF	Joshua Tree Control Facility	ZLC	Salt Lake City UT ARTCC
ZAB	Albuquerque NM ARTCC	ZMA	Miami FL ARTCC
ZAN	Anchorage AK ARTCC	ZME	Memphis TN ARTCC
ZAU	Chicago IL ARTCC	ZMP	Minneapolis MN ARTCC
ZBW	Nashua NH ARTCC (Boston)	ZNY	New York NY ARTCC
ZDC	Leesburg VA ARTCC (DC)	ZOA	Oakland CA ARTCC
ZDV	Denver CO ARTCC	ZOB	Cleveland OH ARTCC
ZFW	Fort Worth TX ARTCC	ZSE	Seattle WA ARTCC
ZHU	Houston TX ARTCC	ZSU	San Juan PR Control Facility
ZID	Indianapolis IN ARTCC	ZTL	Atlanta GA ARTCC
ZJX	Jacksonville FL ARTCC	ZUA	Guam Control Facility
ZKC	Kansas City KS ARTCC		

Glossary of Terms

AAR	*See*, Airport Arrival Rate (AAR).
ADC	*See*, Average Daily Capacity (ADC).
ADR	*See*, Airport Departure Rate (ADR).
AFP	*See*, Airspace Flow Programs (AFP).
Airport Arrival Rate (AAR)	The number of arriving aircraft which an airport or airspace can accept from an ARTCC per hour.
Airport Departure Rate (ADR)	The number of aircraft that can depart an airport and the airspace can accept per hour.
Airport Operations	*See*, Operations.
Airspace Flow Programs (AFP)	Airspace flow programs (AFPs) manage demand-capacity imbalances through the issuance of estimated departure clearance times (EDCT) to flights traversing a flow constrained area (FCA). An AFP might be used, for example, to reduce the rate of flights through a center when that center has reduced en route capacity due to severe weather, replacing mile-in-trail (MIT) restrictions for a required reroute, managing airport arrival fix demand or controlling multiple airports within a terminal area.
Air Route Traffic Control Center (ARTCC)	A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft. Also known as en route or centers. There are 21 ARTCCs in the continental U.S. A list of the 21 ARTCCs appears in the Appendix.
Air Traffic Control (ATC)	A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.
Air Traffic Control Tower (ATCT)	A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the Class D airspace area regardless of flight plan or weather conditions (IFR or VFR). A tower may also provide approach control services (radar or nonradar).
Army Radar Approach Control (ARAC).	An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. Service is provided to both civilian and U.S. Army airports. Currently, the U.S. does not operate any ARACs.
ASM	*See*, Available Seat Miles (ASM).
ASPM	*See*, Aviation System Performance Metrics (ASPM).
ATC	*See*, Air Traffic Control.
ATCT	*See*, Air Traffic Control Tower.
Available Seat Miles (ASM)	The aircraft miles flown in each inter-airport segment multiplied by the number of seats available for fare paying passenger use on that segment. Available seat miles are computed by summation of the products of the number of miles on each interairport segment multiplied by the number of available seats on that segment.
Average Daily Capacity (ADC)	Average daily capacity is calculated as the sum of the airport departure rates (ADR) and the capacity airport arrival rates (AAR), divided by the number of days in the period under consideration.
Average Hourly Capacity (Called Rate)	*See*, Called Rate.

Aviation System Performance Metrics (ASPM)	Aviation System Performance Metrics (ASPM) data includes flights to and from the ASPM airports (including the Core 30 and OEP 35 airports) and all flights by ASPM carriers, including flights by those carriers to international and domestic non-ASPM airports. All IFR and some VFR flights are included. View this data on the OPSNET website. ASPM flight records fall into two groupings: (1) Efficiency flights are intended to capture all traffic handled by controllers at the ASPM airports and include flights with complete records and flights for which accurate estimates are possible due to only a few pieces of missing data. (2) ASPM flights exclude general aviation and military traffic, as well as local (non-itinerant) traffic and records for international flights missing data on the non-U.S. portion of the flight. ASPM contains key event times including actual, scheduled as well as the airline reported gate and runway times. It also synthesizes key times from the traffic flow management system (TFMS) and flight level information from the national traffic management log (NTML).
Called Rate	The hourly throughput that an airport's runways are able to sustain during periods of high demand. Called rates include all arrival and departure traffic that an airport can support. The called rate, or average hourly capacity, is the sum of the average arrival rate (AAR) and the average departure rate (ADR).
Cancellations	The set of cancelled departures as determined by a combination of scheduled flights not flown and TFMS flight plans that were cancelled and not re-filed for ASPM carriers and all other carriers reporting schedule data; and ASQP flight cancellations.
CCF	*See*, Combined Control Facility (CCF).
Center	Also known as air route traffic control center (ARTCC) or en Route. *See*, Air Route Traffic Control Center (ARTCC).
Center Operations	*See*, Operations.
CERAP	*See*, Combined En Route Radar Approach Control (CERAP).
Class B Airspaces	Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of IFR operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspace areas resemble upside-down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace.
Combined ATCT TRACONs	*See*, Terminal Radar Control Facility (TRACON).
Combined Control Facility (CCF)	An air traffic control facility that provides approach control services for one or more airports as well as en route air traffic control (center control) for a large area of airspace. Some may provide tower services along with approach control and en route services. The U.S. has four CCFs. A list of the 4 CCFs appears in the Appendix.
Combined En Route Radar Approach Control (CERAP)	An air traffic control facility that combines the functions of an ARTCC with a TRACON facility.
Core 30 Airports	The 30 airports with the highest number of operations. A list of the Core 30 Airports appears in the Appendix.
Delays	*See*, OPSNET Delays.
Diversions	Gate return / air return and en route diversion are considered a diversion. However, a planned stop for fuel, known before departure from the gate, where the flight has been dispatched to is not.
Direct User Access Terminal Service (DUATS)	DUATS, or direct user access terminal service is a weather information and flight plan processing service contracted by FAA for use by United States civil pilots and other authorized users. The DUAT Service is a telephone- and Internet-based system which allows the pilot to use a personal computer for access to a Federal Aviation Administration (FAA) database to obtain weather and aeronautical information and to file, amend, and cancel domestic IFR and VFR flight plans.
DUATS	*See*, Direct User Access Terminal Service (DUATS).

EDCT	*See*, Expected Departure Clearance Time (EDCT).
Enhanced Traffic Management System (ETMS)	*See*, Traffic Flow Management System (TFMS).
En Route	Also known as Air Route Traffic Control Center (ARTCC) or, simply, Center. *See*, Air Route Traffic Control Center (ARTCC).
En Route Operations	*See*, Operations.
Expected Departure Clearance Time (EDCT)	The runway release time assigned to an aircraft in a traffic management program. *See also*, Ground Delay Programs (GDP).
FCA	*See*, Flow Constrained Area (FCA).
Flight	The period from the start of the takeoff roll to the first landing.
Flight Service Station (FSS)	A flight service station (FSS) is an air traffic facility that provides information and services to aircraft pilots before, during, and after flights, but unlike air traffic control (ATC), is not responsible for giving instructions or clearances or providing separation.
Flow Constrained Area (FCA)	A defined region of airspace, a time interval, or other characteristic used to identify flights subject to a constraint. This constraint may be due to convective weather, military exercises, or other reasons.
FSS	See, Flight Service Station (FSS).
GDP	*See*, Ground Delay Programs (GDP).
Go Around	A go-around (sometimes called overshoot) is an aborted landing of an aircraft that is on final approach.
Ground Delay Programs (GDP)	Ground delay programs are implemented to control air traffic volume to airports where the projected traffic demand is expected to exceed the airport's acceptance rate for a lengthy period of time. Lengthy periods of demand exceeding acceptance rate are normally a result of the airport's acceptance rate being reduced for some reason. The most common reason for a reduction in acceptance rate is adverse weather such as low ceilings and visibility. How it works: Flights that are destined to the affected airport are issued expected departure clearance times (EDCT) at their point of departure. Flights that have been issued EDCTs are not permitted to depart until their expected departure clearance time. These ECDTs are calculated in such a way as to meter the rate that traffic arrives at the affected airport; ensuring that demand is equal to acceptance rate. The length of delays that result from the implementation of a ground delay program depends upon two factors: how much greater than the acceptance rate the original demand was, and for what length of time the original demand was expected to exceed the acceptance rate.
Ground Stops (GS)	Ground stops are implemented for a number of reasons. The most common reasons are: • To control air traffic volume to airports when the projected traffic demand is expected to exceed the airport's acceptance rate for a short period of time. • To temporarily stop traffic allowing for the implementation of a longer-term solution, such as a ground delay program. • The affected airport's acceptance rate has been reduced to zero. How it works: • Flights that are destined to the affected airport are held at their departure point for the duration of the ground stop.
Holdings	Holding (or flying a hold) is a maneuver designed to delay an aircraft already in flight while keeping it within a specified airspace.
IFR Flights	Instrument Flight Rules. A set of rules governing the conduct of flight under instrument meteorological conditions.

Level-Offs	Level-offs are tracked from the top-of-descent (TOD) point or 200 nautical miles (NM) from the airport, whichever is closer. A trajectory segment is considered as a level-off if the change in altitude of position reports is less than or equal to 200 feet and the segment is at least 50 seconds in duration. The metric is calculated as the sum of the count of level-offs for each flight within a scope (i.e. non-military instrument flight rules (IFR) operations arriving into Core 30 airports), divided by the total number of flights within the scope. The metric is derived from flight position reports from the National Offload Program (NOP).
Load Factor	The summation of the number of revenue passenger miles (RPM), divided by the summation of the number of available seat miles (ASM), on revenue paying commercial flights. This quotient is expressed as a percentage. *See also*, available seat miles (ASM) and revenue passenger miles (RPM).
Loss of Separation Events	A defined loss of separation between airborne aircraft occurs whenever specified separation minima in controlled airspace are breached. Minimum separation standards for airspace are specified by ATS authorities, based on ICAO standards.
Miles-in-Trail (MIT)	A specified distance between aircraft, normally, in the same stratum associated with the same destination or route of flight.
National Airspace System (NAS)	The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material. This includes system components jointly shared with the military.
Notices to Airmen (NOTAM)	A NOTAM is a notice containing information essential to personnel concerned with flight operations, but not known far enough in advance to be publicized by other means. It states the abnormal status of a component of the national airspace system (NAS) – not the normal status.
Operations	• Airport operations: The number of arrivals and departures from the airport at which the airport traffic control tower is located. • Tower operations: Airport operations, plus airport tower overflights. • TRACON operations: The number of operations passed to and from area airports or centers, including overflights through TRACON airspace. • En route or center operations: The number of operations passing to and from a TRACON to a center, or from one center to another center, or from a center to a TRACON. It includes U.S. overflights and oceanic traffic through center air space that do not arrive at or depart from U.S. territory.
Operational Network (OPSNET)	OPSNET is the official source of national airspace system (NAS) air traffic operations and delay data. This data are used to analyze the performance of the FAA's air traffic control facilities. Reportable delay includes information such as the constrained facility, the reason for delay (weather, equipment, runways, volume, etc.) and the traffic management initiative (TMI) employed in delaying the aircraft.
OPSNET Delays	Delays to instrument flight rules (IFR) traffic of 15 minutes or more, which result from the ATC system detaining an aircraft at the gate, short of the runway, on the runway, on a taxiway, or in a holding configuration anywhere en route, must be reported. The IFR controlling facility must ensure delay reports are received and entered into OPSNET." These OPSNET delays are caused by the application of initiatives by the traffic flow management (TFM) in response to weather conditions, increased traffic volume, runway conditions, equipment outages, and other causes. Below are descriptions of the categories of delay causes resulting in a reportable delay: • Weather: The presence of adverse weather conditions affecting operations. This includes wind, rain, snow/ice, low cloud ceilings, low visibility, and tornado/ hurricane/thunderstorm. • Volume: Delays must only be reported as volume when the airport is in its optimum configuration and no impacting conditions have been reported when the delays were incurred. • Runway/Taxiway: Reductions in facility capacity due to runway/taxiway closure or configuration changes. • Equipment: An equipment failure or outage causing reduced capacity. • Other: All impacting conditions that are not otherwise attributed to weather, equipment, runway/taxiway, or volume, such as airshow, aircraft emergency, bomb threat, external radio frequency interference, military operations, nonradar procedures, etc. Non-reportable delays are delays incurred by IFR traffic, but which should not be reported in OPSNET.

Overflights	• Terminal overflight: A terminal IFR flight that originates outside the TRACON's/RAPCON's/Radar ATCT's area and passes through the area without landing. • En route overflight: An en route IFR flight that originates outside the ARTCC's area and passes through the area without landing.
Radar Approach Control (RAPCON)	An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. Service is provided to both civilian and U.S. Air Force airports. Currently, the U.S. does not operate any RAPCONs.
Radar ATC Facility (RATCF)	An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. Service is provided to both civilian and U.S. Navy airports. Currently, the U.S. does not operate any RATCFs.
RAPCON	*See*, Radar Approach Control (RAPCON).
RATCF	*See*, Radar ATC Facility (RATCF).
Revenue Passenger Miles (RPM)	One revenue passenger (fare paying passenger) transported one mile. Revenue passenger miles are computed by summation of the products of the revenue aircraft miles on each interairport segment multiplied by the number of revenue passengers carried on that segment.
Runway Incursions	A runway incursion is any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and takeoff of aircraft.
Stand-Alone TRACON	*See*, Terminal Radar Control Facility (TRACON).
Terminal Radar Control Facility (TRACON)	An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. A TRACON located in an air traffic control tower is an up down or combined TRACON. A TRACON that does not share a facility is a stand-alone TRACON. The U.S. has 154 civilian TRACONs. There are 129 TRACONs in shared facilities and 25 stand-alone TRACONs. A list of the 25 stand-alone TRACONs appears in the Appendix.
Top-of-Descent (TOD)	Top-of-Descent is the transition from the cruise phase of a flight to the descent phase, the point at which the planned descent to final approach altitude is initiated.
Tower Operations	*See*, Operations.
TRACON	*See*, Terminal Radar Control Facility (TRACON).
TRACON Operations	*See*, Operations.
Traffic Flow Management System (TFMS)	TFMS is a data exchange system for supporting the management and monitoring of national air traffic flow. TFMS processes all available data sources such as flight plan messages, flight plan amendment messages, and departure and arrival messages. TFMS is restricted to the subset of flights that fly under instrument flight rules (IFR) and are captured by the FAA's en-route computers. Formerly known as the enhanced traffic management system (ETMS).
VFR	*See*, Visual Flight Rules (VFR).
VFR flights	Flights operated under visual flight rules.
Visual Flight Rules (VFR)	Visual flight rules are rules that govern the procedures for conducting flights under visual conditions. The term "VFR" is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate a type of flight plan.

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